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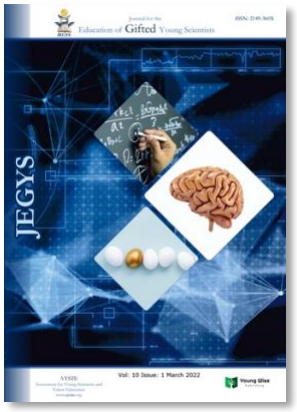

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From the Editor: How realistic is the discourse of talent developing school?

Abstract
A school model that develops talent is never realistic. I explained why this is not possible. Important tips have been given for families and educators who care about talent development after the pandemic. The pandemic has solved the codes of the EPGBU model and made it emerge as the most suitable gifted education model. The spread of this program model, which has goals and objectives in parallel with JEGYS, is important in terms of meeting the need for young scientists in the world. H.W. Wilson Education Source Fulltext is one of the education field indexes for promotions in Turkey, and JEGYS indexed in this index. JEGYS is in its 10th year, thanks to those who contributed to its publication for many more years.
Keywords:
EPGBU model, giftedness components, talent developing school, underdeveloped and developed countries

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Dear Authors, Readers, Reviewers, Editors
What the pandemic has taught us is the socialization aspect that is the most important aspect of the school. Families for school; They began to think that "it would work even if it didn't have other features". They said that now our children are also right, that school is not a concept that is given a "blessed" meaning as it used to be. We started looking for answers to these questions; So what is school? How should it be?

It has now been understood that the talent development aspect of the school is weak. Why is that? because schools generally cater to students of average or below-average intelligence. It focuses on what needs to be taught as a minimum. This causes it to be an institution that cannot respond to gifted students who want to improve their skills.

Is there a school that develops talent? Of course not. It is not possible. An institution that develops talent cannot be a school. Because this institution should not have stereotypical rules and routines. At most, talent-developing institutions can only be supportive programs, courses, and mentoring services.

EPGBU developed by Tortop (2013)[1], which is one of the important models in the training of gifted young scientists, is a university-supported e-mentoring program. It is a program that develops academic ability. Talent training in other talent areas can also be designed in accordance with this training model. Talent develops only with mentors in that field of talent. This is the biggest advantage in talent development in developed countries. However, as I explained in the preface to the previous issue, this advantage will be lost in 10 years. Because space is no longer a registered-conditional element for talent. The most important element in the order whose change is expected is Time. Time will come to be an element that the gifted can easily manipulate. This means that in the education of the future, time and space will be indifferent and the most important lesson will be history. but this history lesson will be an indispensable part of talent education, as it is the history of talent fields, and a historical journey in which the future is designed, not the past.

JEGYS is 10 years old. I am honored to share this happiness with you. It has started to be an important actor in the world's talent education.

In this issue, we have good news for academics in Turkey. JEGYS is included in "H.W. Wilson Education Source Fulltext" according to UAK associate professorship criteria. Therefore, you can use your published articles as a trainee index for associate professorship applications.

We would like to thank all authors, editors, referees and readers who contributed to the spring issue of 2022.

Best regards
Dr. Hasan Said Tortop
Editor-in-Chief of the JEGYS

[1] Tortop, H. S. (2013). A new model program for academically gifted students in Turkey: overview of the education program for the gifted students' bridge with university (EPGBU). *Journal for the Education of Gifted Young Scientists, 2*(1), 21-31.

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Review Article

A key to excellence: patience and patient in the early Sufis

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Abstract

Patience is one of the basic principles of Sufism, which is widely included in the Quran and hadiths. In Sufi understanding, it is accepted that the basis of patience is to abandon the complaint and complaint to the divine appreciation. Patience is one of the basic levels that must be reached by the Sufis on the way to becoming a perfect human. The early Sufis defined patience according to their spiritual state and graded it as the patience of ones who obey the god and lover of the god. Patience is one of the basic levels that must be reached by the Sufis on the way to becoming a perfect human. The early Sufis defined patience according to their spiritual state and graded it as the patience of the abids and the minstrels. Terms that are important in Sufism such as submission, zuhd, poor, consent, which are related to patience; They are regarded as facilitators of patience. These levels are elements that complement each other in combating the nafs. For Sufis, the reward of patience is forgiveness and eternal happiness. Therefore, it is seen as an element of psychological treatment, as it requires patience, tolerance against obstacles and preserving hope for the difficulties of worshiping. Patience, a transformation and educational activity in terms of achieving positive personality traits is one of the important points in Sufi terminology.

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Introduction

Patience is one of the important concepts in the understanding of Islam. Patience, which was mentioned in the concepts of tahalluk by the Sufis of the first period, is an important value for spiritual development. This spiritual virtue is one of the factors that feeds social life. Patience has an important effect on shaping religious and social life. In the Quran and hadiths, patience is the moral rule that should be asked from Allah as a blessing. Allah tests His servants, especially prophets, with misfortunes such as poverty, fear, death, and sickness. However, the reward of a believer to fulfill his worship, to be steadfast against calamities, to stay away from sins and to show patience is to have merit through maturation in the world and to gain reward in the hereafter. The first period Sufis regarded the patience of human beings who came from Allah and will go to Allah as the key to victory and patience; They see it as a broad concept that includes concepts such as consent, surrender, trust, impoverishment, asceticism and opinion.

The meaning of patience in the dictionary is imprisoning, daring, medicine, preventing, keeping, resisting (Isfahani, 2009; al-Zabīdī, 2008:12; Çağrıcı, 2013:35; Ibn Manzûr, 2010:2; al-Jawziyye, 2008 Corbin, 1978). Patience in the Sufism terminology is; a person's leave the complaint about troubles, sorrows and worries and to abandon them for Allah and to stay away from things that give pleasure to the soul. Patience is the most effective means of gaining traits that endure the difficulty of orienting and correcting the soul, since it includes all maqam, state, morality and deeds. Patience, which is seen as the key to every comfort in Sufism; It is described as "the morality of the individual", "the order of the creator", "the legacy of enbiya and saint."

The concept of patience is the opposite of whining, which means resorting to violence by being defeated by anger.

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Therefore, one's persistence in suffering and trouble by finding the middle way is one of the ways of reaching Allah for the early Sufis. Because, getting rid of bodily tastes and egoistic pleasures, imprisoning them in the distress of self-worshiping, and persevering with struggle are the indicators of devotion and purification. For the early Sufis, since patience is connected with faith, it will be appropriate to evaluate the truth of patience in terms of verses and hadiths. In the classical sources of Sufism, the first period Sufis generally mention the authorities and achievements that accrue to the triple classification of patience, making it easy to explain the side of patience that constitutes a source of Sufism. Within the scope of this article, the views of the Sufis on the truth of patience, the interpretations of patience and the achievements of patience will be emphasized, especially in their early work.

The Concept of Patience in Verse and Hadish

Patience, which is mentioned as one of the moral qualities in the Quran; It is a means for believers to gain mercy, consent, love and satisfaction. In the Quran patience which is mentioned in 103 places along with its derivatives, is used as a dictionary in some verses and with the word gratitude in four verses, and in other verses it is mentioned as reporting through prophets, which is the moral dimension of distress and suffering (ʿAbd al-Baqī, 2008: 3; Yılmaz, 2013). The relationship of patience with the soul, with the heart and with the love of Allah is clearly seen in the verse "O believers, be patient (isbirû), resist (sâbiru), prepared for war, be awake râbitû".[2] In the verse, it is emphasized that patience is necessary, that it should be widespread, and patience should be persisted. According to Tabari, the first patience mentioned in the verse is absolute. Other means of patience and kindness. Absolute, individual patience; The mutual patience that occurs between people is a chaperone (at-Tabari, 2008:7). According to Qushayrî while patience is against one's own self, musarabara is against the enemy (Qushayrî, 1981:1). Hasan al-Basri stated that it is necessary to be patient because of religion, perseverance in patience due to poverty and hunger, and competition in patience are jihad against the soul and the enemy (Rāzī, 1420: 9).

While the words of patience and gratitude are mentioned as "those who are very patient and thankful" in the Quran, being a leader in religion depends on patience and compassion. God's forgiveness, mercy and guidance to those who persevere as a result of testing their servants with fear, hunger, life, property and children; It is to aspire to the gospel of "the result belongs to those who have taqwa", which is sure of the reward of patience. These gospel holders; He is praised as those who spend their wealth for Allah and advise the right and patience. Allah loves those who are patient and be with them; It shows that patience is better and it will give good results.[3]

The Quran states that patience is the morality of the prophets. He stated Ayyub in his qualification[4] and wanted his ummah to show their understanding of patience towards what happened to them[5]. Allah commanded his prophets to be patient, but he said that patience will only be with the help of Allah and patiently, all misfortunes will be overcome easily.[6] Although patience is a condition that is generally praised, the determination of the polytheists to resist to serve idols is criticized in the verse, and their patience for what happens to them is condemned. In addition, selfish behaviors that do not comply with patience such as haste, complaint, and anger are not deemed appropriate[7] As can be seen in more than a hundred verses, resist, resist, not give up, endure all kinds of difficulties and cruelty in fighting the struggle of your faith, endure against the pain and bad events and not falling into despair, observing Allah's approval in the face of difficulties, it is used to mean persistence.

Prophet is one of the examples for Muslims with his patience. There are many narrations in the hadiths about the virtue of patience: His statement that "God is patience"[8] indicates that patience is the name and quality of God; The hadith "No one has been given a better reward than patience"[9] shows that a great part of good is patience. Hz. The Prophet's advice "patience is bright"[10] and to a woman who lost her child "be afraid of Allah and be patient"[11] is a sign of the protective feature of patience and the attitude of the believer against suffering. The fact that patience has a maturing and cleansing aspect of sins is that "There is no illness, worry or any smaller event that hits a believer's

[2] Âli ‘Imran, 3/200.
[3] Ibrahim 14/ 5; Luqman, 31/31; Saba 34/19; Ash Shuraa, 42/33;as-Sajdah, 32/24;al-Baqara, 2/153,155,157; al-Anfal, 8/28,46,66; al-Qasas, 28/83;Âli ‘Imran, 3/17,146; al-‘Asr, 103/3; an-Nahl, 16/126; an-Nisa, 4/25
[4] “ Indeed, we have found Ayyub as a patient. What a beautiful servant he was! He was a person who turned very much towards Allah. Sad, 38/44.
[5] al-Ahkaf, 46/35; “The moment we told about İsmail, İdris and Zülkifl; each of them was the patient” nbiya, 21/85.
[6] Tur, 52/48; “And they brought a shirt of fake blood on it. Jacop said: "No! Your souls deceived you and dragged you to such a job. Now my task is patience. And only Allah will be asked to help you against what you tell. Yusuf, 12/18; “Take what they say and walk away from them appropriately.” al-Muzzammil, 73/10.
[7] al-Furqan, 25/42; Sad, 38/6; Ibrahim, 14/21; al-Baqara, 2/175;Enbiya, 21/37,87; Kalem, 68/48; Ahkaf, 46/35; Neml, 27/72;Mearic, 70/19-20; Âl-i İmran, 3/134; Tevbe, 9/15).
[8] Bukhârî, Edep, 71.
[9] Bukhârî, Zekât, 50; Rikak, 20.
[10] Muslim,Taharet, 1.
[11] Bukhârî, Cenaiz, 32, 42; Muslim, Cenaiz, 14-15

servant that Allah should not erase some of the sins of the servant with that misfortune"[12] and "Whoever suffers the misfortune as Allah commands" After saying İnnâlillâhi ve innâileyhirâci`un (We are servants of Allah and we will return to Him);[13] "My God, give me good deeds because of this misfortune I have faced, and then give me blessings after that", Allah will do so".[14] In the hadiths, patience is an attitude that is desired to be shown at the time of suffering. In this sense, "act with sincere (sincerity) for Allah regarding consent. If this does not happen, be patient, because patience has great goodness," as stated in the hadith, patience is attributed to the strength of the morality of consent (Bayhaqī, 1410:2) . Not patience, stillness, laziness and lethargy emphasized by the Quran and hadiths; It is a blessing that facilitates hardship and distress, in return for which reward is promised, rewarding, bringing to high positions and encouraged. Commanding the prophets to be patient with the judgment of Allah is important for believers in terms of comfort and encouragement.

The Truth of Patience in Early Sufis

Patience, which is a universal moral principle, has been accepted by the Sufis as one of the most important ranges and positions to be reached on the way to becoming a perfect human being (Kalâbâdhî, 1994; Qushayrî,1989; al-Makki, 2014:2; Ansari,1988; al-Sarrâj, 1960; Suhrawardī, 2011; Hujvirî, 2000:2) According to Sufism, patience; to fulfill the orders of the religion, stay away from sins, and expect only Allah to pay back in times of misfortune. Patience, which is unimaginable about animals and angels, but which is given importance due to its human character, reflects the ascending idea to God (Afifî, 2018). Patience is produced in spiritual situations, which generally mean loading difficult things into the body and enduring them, by keeping the body and the soul from what is desired as a requirement of lust. If spiritual patience is about chastity against sexual desires, patience if against a misfortune, asceticism agaist living in abundance, if it is about suppressing anger and anger if it is about the troubles of war, if it is about keeping secrets, the spiritual soul is against the scarcity of wealth and wealth. If it is about the opinion, if it is about wealth, it takes different names such as self-control (Rāzī, 1420: 4).

Sufis generally gave meaning to patience according to their spiritual state. According to Hasan al-Basri while patience was to stop suffering from suffering and obedience, while according to Ahmad b. Hadrawayh it is said to be patient in showing patience, not to the oney who complains, but when asked to Bagdâdî, "What is patience?" patience, sip pain without grimacing" he replied. While Zünnûn al-Mısrı Regards patience as resisting the slap of his loved one and even enjoying his slap while Ruveym b. Ahmad defined patience as abandoning complaints and whining, Shibli after defining patience as separating from Allah, read the following verses: "With the pain of enthusiasm, the fear of separation; The lover collects damage by wailing,always competed, patience asked for help,He said: Patience, patience! You get out of trouble" (Sulamî, 2018; Kalâbâdhî, 1994; Qushayrî,1989; al-Sarrâj, 1960; Suhrawardī, 2011; Hujvirî, 2000:2).ʿAbdul Qādir Gīlānī, stated that Sufism was founded on eight fundamentals, and that each of these eight basic principles was a prophet that this attribute referred to in him. He integrated it with Ayyub Tüsteri interpreted the words of Abu'd-Darda, "The most perfect point of faith is patience to divine judgment and acceptance of destiny" as "patience is the highest of obedience" (Jîlânî, 2010; al-Makki, 2014:2). Abu Talib al-Makki stated that patience is one of the four basic principles of Islam and the way to achieve ingenuity (al-Makki, 2014:2). Kalâbâdhî states that Allah wants to cleanse the people of patience by making them the leader of the righteous. The patience shown by the servant in matters such as obeying the orders of the religion, staying away from sins and keeping his fortitude It brings with it cleansing from sin. As a matter of fact, Sahl said "patience is cleanser, things can be cleaned with it" (Kalâbâdhî, 1994). Here, misfortune and patience to the world and cleansing from the dirt of sins are seen.

Patience is the highest degree of reward for the Sufis. The verse, "Allah will give those who are patient their rewards without calculating" (az-Zumar, 39/10) is Ibrahim b. Adham regards the virtue of patience as unlimited and untold reward. According to him, if a servant wants to hope for reward from Allah, he should get used to being patient (al-Sarrâj, 1960; al-Makki, 2014:2). Al-Serrâj and al-Makki; They interpreted the reward of this patience resulting from the tolerance of the absence of what the soul is accustomed to as heralding Allah's forgiveness, mercy and guidance (al-Sarrâj, 1960; al-Makki, 2014:2). This type of endurance is called tasabbur (al-Ghazālī,1960:4). According to al-Muhâsibî tasabbur is the soul's tolerance of hardships and sipping pain. Thus, the owner of the tasabbur acquires cleansing from sins in the hope of good deeds. The owner feels most of the pain in himself (Ibn Fûrak, 2014). According to Qushayri patience is divided into two as the patience of the abids and the lovers: The most beautiful form of patience of the abids is that the state of patience is not harmful as the patience is reserved for the kindness. The patience of the lovers, on the other hand, is that they abandon the patience for the truth. Yahya b. Muâz also said that the patience of the

[12]Bukharî, Merda, 1; Müslim, Birr, 52
[13] Bakara, 2/156.
[14] Muslim, Cenaiz, 3-4.

lovers is stronger than the patience of the worshipers and worshipers. According to Abu'l-Hasan b. Sâlim, the people of patience are three:

- *Correspondence*: He is patient with Allah's accident and misfortune. This person should be prepared and consent to God's decrees by forcing himself to be patient. In the words of Abrâhim Kannâd's He constantly fulfills the orders.
- *Reporter*: It is a person who has complaints from time to time but is not settled as a habit of impatience. Zunnûn al-Mısrî states that when he sees a patient moaning, a person who does not taste the slap of his loved one cannot be sincere in his love, let alone be patient with the slap of his loved one.
- *Sabbar*: A person who is patient with Allah for the sake of Allah, who does not cause any change in his appearance or inwardness and does not show weakness (Khaja Khan, 2003; al-Serrâj, 1960; Suhrawardī, 2011). While patience is graded here; Determination to move away from familiar things such as sinning and tendency to nature is essential. For, the soul continues to tend to the lower level before it reaches the level of mutmainne. When the rank of Mutmainne is reached, he removes him from masiva by being a member of God's Self (Najm al-Dîn Kubrâ, 2018). al-Ghazâlî also classified those who, like Qushayri, had three positions:"The first is to abandon lusts; This is the authority of those who repent. The second is consent to the accident; this is the degree of patience of the witnesses. Thirdly; bitter and sweet is the degree of patience of those who welcome everything that comes from Mawla with pleasant and affection; this is the seat of the Siddiq. The station of consent is superior to the station of patience, and the station of affection is superior to the station of patience (al-Ghazālī, 1960:4). Abu Talib al-Makki divided his patience into three, namely, doing the necessary things for the improvement of the religion, abandoning the things that spoiled the religion, and being patient by not opposing the truth: According to him, if a person reforms his religion and shows patience in the things that enliven him, he will be perfect. If he is patient with the things that break his religion, it will be close to him. Patience for blessings without rebellion is the characteristic of those who are ascetic. As a matter of fact, Sahl finds it harder to be patient and not to rebel than to be patient with trouble (al-Makki, 2014:2). Qushayrî, While they regarded patience as hardship for Allah, they regarded patience with Allah as survival, patience for God's sake as trouble, patience with Allah as loyalty and patience from Allah as painfulness. So patience; patience billâh (patience with Allah), patience lillâh (patience for Allah), patience ma`allah (patience with Allah), patience fillah (patience in Allah) and patience 'anillah (patience from Allah). Patience billah is better than patience lillah. Because, with the first divine will, the second is the human will. Therefore, the Messenger of Allah: I will live with you and die with you,[15] "O Lord! He commanded" (Qushayrî,1989; Khwaja Abdullah Ansari, 1988; Hamadânî, 2015).

According to the first period Sufis, patience increases the calmness and endurance in the heart of a person by considering the benefits of the world and the hereafter in the face of things that are heavy and unpleasant. Responding to the desires of the soul is realized by not giving him the things he has made and loved (Kubrâ, 2018). Being patient against the desires of the soul, which is mentioned as spiritual / spiritual patience, is regarded as full and good patience, and this patience is honored. As a matter of fact, Abrahim al-Havvâs expressed this honor with the following couplets: "Patience has honor, I will always be patient. I am willing to our world, even if it is a little bit of fortune (Suhrawardī, 2011).

Most of the time, the soul prevails in terms of the actions put forward; In this case, the human's duty is to take a stand against negativities and patiently put forward an honorable attitude that suits him. Patience is the remedy of the illnesses of the soul, as it is a potential candidate for evil people to the end of their life. According to Ferîdüddin Attâr, these diseases are; shirk, unbelief, ignorance, heedlessness, sin-i kabair, arrogance, greed, buhûl (stinginess), lust, wrath (anger), envy, hqid (grudge), which are among the bad qualities of the soul of the soul, are. Hallâc Mansûr explains these qualities as "if you do not occupy your soul, it will keep you busy" and attributes the truth and perfection of patience to a certain cause (Farîd al-Dîn'Attâr,2 020; Mâverdî, 1992; Ghazālī, 1960:4).

The first period Sufis who took patience from different angles according to their own legends and made various evaluations; He states that the soul, which is happy as a result of self, devotion and affliction, is educated by getting rid of masiva. Therefore, patience should be revealed as a moral quality realized in the self of the servant. In addition to their patience in the face of difficulties, Sufis also see patience in spaciousness and comfort as a test. Otherwise, it is not patience to silence the injustices, to observe every evil, to submit to wrongdoing, to surrender to falsehood and evil, it is to avoid responsibility, it is to turn towards the purpose of creation. Because patience is not a withdrawal and

[15]Bukhârî, Tevhid, 13; Muslim, Zikr, 59.

passive behavior. Patience means resisting even when the range of action is limited, seeking relief from troubles, trying to find solutions.

Mystical Terms Conducted With Patience

Submission

Submission in Sufi sense; after making the utmost effort and taking all the precautions, it is to refer the business to Allah and to become aware of the fact that Allah is the representative of God with all his personality, by relying only on what is in the presence of Allah and not putting his hopes on the hands of others (al-Serrâj, 1960; al-Kalâbâdhî, 1994; al-Qushayrî, 1981:2; Suhrawardī,2011; Ansari,1988; Ankaravî, 2011).

Submission, which is accepted as a maqam among the sufis, is emphasized in many verses in the Quran.[16] In these verses, people who are not in doubt about believing in Allah are generally ordered to put their trust in Allah beyond advice and it is perceived that trust is a sub-branch of faith. The Sufis ranked the realities they experienced in various stages based on the apparent manifestation meant in the verses. Of these people, al-Serrâj and Herevî divide their trust into three degrees: The first of these is the trust of ordinary believers. AbuTurab an-Nahşebi expresses trust in three principles: It is to take the body out of the circuit, to leave the heart in fullness and to be content with the sufficient amount. Those who are at this level of trust are grateful when given, and when not given, they show consent to destiny and be patient. In the words of Ruveym b. Ahmed, they trust God's promise. According to Sahl, this submission is releasing himself to divine divinity. Abu Bakr Zerrak defines his trust as reducing life to one day and getting rid of tomorrow's anxiety. The second degree is the trust of the air. The trust of those at this level is to be subordinate to God alone, without being due to reasons. It is like the dead in the grave, in a way, that the soul dies and does not compliment even the submissive and takes everything out of his mind. As a matter of fact, AbuYâkub en-Nehrecûrî replied that "the soul dies because the pleasures originating from the world and the hereafter are gone" when asked about it. Here, it is based on breaking trust from ideals and not being trusted to them. The submission of Hâssü'l-havâs is to know that existence belongs only to Allah and to trust in Allah. As a matter of fact, Abu Abdullah b. While defines his trust as "In any case, taking refuge only in Allah", -i Bağdâdî described it as "The trust of the heart in Allah". It is not possible for the trust here to be realized with the perfection of any of the people (al-Serrâj, 1960; Ansari, 1988). According to Abu Ali Dekkak the trustee's; It has three degrees of trust, surrender and tafviz: "First, he finds peace by trusting the promise of Allah, the person of trust. Secondly, the surrenderer, who knows the state of Allah, counts as a universe with his knowledge. Third, the owner of the tafviz agrees with the judgment of Allah. " Qushayri reports that he heard Abu Ali's explanation as follows: Submission is the attribute of a believer; submission is the attribute of the marriage; Tefviz is the adjective of the almighty people. In this case, submission is the attribute of the commons, the attribute of the submission, and tafviz is the attribute of those who have a mood in the air (al-Qushayrî, 1989).

Submission in Qushayri is one of the conditions of faith. The apparent submission is knowing not to reject the decree of Allah, which is generally the understanding of believers. It is to observe that all events that take place are with Allah or that they were brought about by Allah and that they take place for Allah, which is the understanding of submission of the air, that is, the truth of submission. Whoever loses his sense of trust cannot be named a believer (al-Qushayrî, 1981:1).

The fact that patience and submission complement each other in Sufi understanding, Hz. It can be based on the hadith of the Prophet, "A person who sits in his place with patience and awaiting reward when he encounters Taun, with nothing but what Allah has written (after resorting to measures and reasons against it), will be rewarded for the reward of a martyr." [17] The beginning of every job is the end of patience and dedication. As a matter of fact, Junaıd Baghdadi; "The ultimate point of patience is submission[18] that is why Allah said that he said, "Those who are patient put their trust in their Lord"(Farîd al-Dîn'Attâr, 2000). According to al-Makki what distinguished servants put their trust in Allah is patience to verbal and actual persecution from people. Because Allah commands the Prophet, "Then take Him as proxy and be patient with what they say."[19] The praise and reproach of the people is one and the place of trust cannot be attained unless they are persecuted and patience with them. Submission in patience is also accomplished by treating people nicely and by leaving them to argue with them (al-Makki, 2014:3).

[16]Âli Imrân, 3/159, 173; an-Nisâ, 4/81; al-Maidah, 5/11, 23; al-Anfal, 8/2, 61; at-Tawbah, 9/51, 129; Yunus, 10/84, 85; Hud, 11/56; Ibrahim, 14/12; al-Furqan, 25/58, 75; ash-Shu'arâ, 26/216-217; an-Naml, 27/79; al-Ahzab, 33/3, 48; az-Zumar, 39/36, 38; Müjâdila, 58/110; al-Taghabun, 64/13; at-Talak, 65/3; al-Muzzammıl, 73/9; at-Talaq, 65/3.
[17]Bukhârî, Tıbb, 17.
[18] Nahl,16/42.
[19]al-Muzzammıl, 73/10.

Although it is obligatory to trust in Allah at the beginning and end of a job, it is important to take all the necessary precautions and ask God for the result, therefore it is important to wait patiently for trust. Continuation and insistence in the faith of the believer should not lead to inertia, which is the state of "not taking action towards a goal". In Islam, submission and kesb are two elements that complement each other. As a matter of fact, the sehl is the state of the Prophet "trust in this relationship kesb is sunnah. He summarized that anyone who is in his state will not abandon the circumcision strictly"(al-Qushayrî, 1989). In this understanding, trust is not to reject esbabs, but esbaba is a de facto act as a requirement of the enterprise.

Consent

Consent to Sufi terms; The acceptance of the servant to the divine will that carries out the decree is the situation that causes the servant to attain rıdvana in the hereafter as per the pre-eternal discretion (al-Serrâj, 1960; al-Kalâbâdhî, 1994; Suhrawardī, 2011; Ankaravî, 2011). The truth of the consent, in which the state of contentment arises by getting rid of the complaint with patience and trust; In the Sufi literature, it has been classified as maqam, or both state and maqam. Since consent is obtained in a strict manner depending on the effort of the servant at the beginning, its final and advanced degree is from the sentence of state of being delusional (al-Qushayrî, 1989; Yılmaz, 2015).

Consent praised[20] in the Quran and praised as "the greatest blessing"[21] in hadiths; It has been accepted as the top of the mysticism authorities (Yılmaz, 2015). The ranks of self-consent and self-marziyya, which are used to mean that the servant is pleased with Allah and Allah from the servant, are two difficult and painful ways in which consent evolves in the servant. The existence of mutual consent between Allah and the servant in these levels of self, which is stated in the verse "You are pleased with Him, and He is pleased with you"[22], shows that there is unwavering surrender to the decrees of accident that appear to be good or evil. Junayd's "What is consent?" When asked, "it is to abolish the will" and the answers of Ibrahim al-Qassar "He does not make a request for his consent" are indications of this submission. This surrender is to settle for everything that is accidental and appreciated. This kind of consent is the head of the way of havâs all states are equal here (al-Serrâj, 1960; al-Kalâbâdhî,1994; al-Qushayrî,1989; Ansari, 1988).

According to the Sufis, all the effort of the servant regarding patience should be only for the sake of Allah. While Râbiâ al-Adeviyye said, "A person can never reach his consent unless he is patient with the misfortunes from Allah", Şah Şucâ Kirmânî divided the cond1ition of patience into three; They stated that abandoning the complaint, a sincere consent, and accepting the manifestations of destiny with willingness was found in the relationship of patience-consent, affection, love and enthusiasm ('Attâr, 2000; al-Qushayrî, 1989).

Because of taking pleasure from consent and valuing consent, a person may attain some manifestations. Companion Imran b. Husayn received the visit and salutation of the angels for thirty years because he was patient with abdominal pain. In fact, this narration is that consent will bring spiritual signs to misfortune. According to Hossain an-Nûrî, a person who carries out the state of consent can see some things in the divine presence (al-Makki, 2014:3; al-Kalâbâdhî, 1994). Consent without patience, patience cannot be achieved without consent. Calıphe Umar states that good consent is in consent, but one should not leave consent patiently. According to al-Ghazali, affection arises because complying with the judgment of Allah creates a basis for perfection of patience. Because the conversation person tolerates even the thorn that looks at his feet because he is immersed in love and is in a state of ecstasy. This relationship of consent and patience is the love of Allah and the love of the hereafter. The heart, in which the taste of divine love takes hold, is content with all deeds. As a matter of fact, "A job that belongs to your lover; Of course, he is the beloved, too. In his understanding, the servant sees the taste of seeing his beloved's old man by leaving his old man (al-Qushayrî, 1989; el-Ghazālī,1998; Suhrawardī, 2011).

Fakr

In the term of Sufism, poverty means keeping his need in his heart and not disclosing it to anyone but his Lord, and realizing that he owns nothing by realizing that the owner of everything is Allah. The Sufis stated that the poor is a way of life rather than a theoretical knowledge, and that it is a maqam (al-Kalâbâdhî, 1994; al-Serrâj, 1960; as-Sulamî, 1981; al-Qushayrî, 1989; Suhrawardī, 2011; Ansari,1988; Yılmaz,2015).

Patience against the poor is a desirable situation. Because in true friendship, a friend does not lose his friend's decree, he is patient with him. According to Bişr al-Hafi, the most superior of the maqams is to observe patience by standing on the poor until grave. Patience to be very poor has also caused badness in this sense (al-Hujvirî, 2000). According to Qushayri, the poor people are pure-hearted (pure-hearted) people chosen by Allah among His servants. The right protects the people through them. He increases his sustenance and abundance for their sake. The patient

[20]al-Bayyinah, 98/8; at-Tawbah, 9/62; al-Ma'idah, 5/16; al-Fath, 48/18.
[21]İbnMâce, Duâ,3.
[22]al, Fajr 89/27.

and poor people will be found by Allah on the Day of Judgment. The Prophet says: "Everything has a key, and the key to heaven is to love the poor and the sluggish. The patient poor will be present on the Day of Judgment by Allah"(al-Qushayrî, 1989).

In the relation of fakr-patience, according to the hadith of the Prophet, "If a person who wants something from the people is turned away without giving anything to a needy situation, those who refuse will not be destroyed"(Ajluni, 2000:1). They gave importance not to want. Indeed, in a poem:"They said to me, 'Tomorrow is a holiday, what are you going to wear?' I said, I wear it patiently tomorrow's hank libas; He is under the labors of patience and poverty; A heart that sees its Mawla on holidays and Fridays; The most beautiful dress is your lover on the visiting day (al-Kalâbâdhî,1994; Suhrawardī, 2011).

Sufis stated the importance of continuing patience by becoming aware that the poor requires patience and that the person himself/herself needs Allah (istiğnâ billâh) regardless of the position he / she is in. This neediness is not only due to material but also because of spiritual and spiritual issues. The servant continues his poverty by being patient with the temporary worries of the world by not seeing any presence in himself.

Zuhd

Especially in zuhd term, which is the understanding of the first period of Sufism; It is defined as not demanding the world, matter and interest in order to orientate towards Allah and the hereafter, destroying the love of possessions in one's heart and concentrating on worship by not giving the opportunity to self-desires even if you own a property (Suhrawardī, 2011; al-Qushayrî,1989; al-Serrâj, 1960; al-Kalâbâdhî, 1994; Yılmaz, 2015).

The attitudes of the first period witnesses against the verses that condemn the world[23] and recommend preparation for the hereafter determined their understanding of patience and zuhd. Prophet's "World is forbidden to the people of the hereafter; As in the hadith (Ajluni, 2000:1) both of them are forbidden to the people of the people, it takes patience to be witness to both the world and the hereafter. The characteristic feature of the Zuhd period is to accrue a life of patience. The characteristic feature of the Zuhd period is to accrue a life based on patience. In the understanding of Zuhd, it is more important to leave the world and its contents by heart. al-Serrâj evaluated the people who do not find a place in the heart of the world wealth as holy and quoted the words of Bağdâdî as "the hand is from the wealth and the heart is the complete state". Reaching this rank can be achieved through trust in God and patience. Hâtem-i Asam stated that "the head of the zuhd is trust in Allah and patience in the middle (al-Serrâj, 1960; Attâr, 2000).

Some Sufis considered the zuhd as the head of the authorities. Caliph Ali, counting the ascetic as a place of patience, expressed that it is the main pillar of faith as follows: "Faith has four pillars. These are patience, closeness, justice and jihad. Patience is also divided into four parts. These are enthusiasm, fear, zühd and murâkaba. Whoever aspires to heaven will stay away from lust. Whoever is afraid of fire will withdraw from haram. Whoever throws the love of the world from his heart, misfortunes will come easily to him" In this case, the servant is grateful for his state, and if he is patient, he is satisfied with the grants of his Lord (al-Makki, 2014:2; al-Qushayrî, 1989).

It takes patience to walk on the path of Zuhd, not to be happy with what is and not to feel sorry for what is not. The factor that turns a person away from everything that prevents him from Allah and leads him to ascetic is the demand for the hereafter. In this sense, zuhd is the targeted goal and patience is essential to achieve this goal.

The Benefits of Patience for The Early Sufis

The subject of patience is one of the forces that lead man to struggle. The Sufis, evaluating their patience according to their legends, stated that the reward of those who persevere will be given to the extent of the test they come to power. This reward has been seen more important and more than all rewards. According to Abu Talib al-Makki, Allah did not set limits and calculations on the reward of patience. According to him, those who are patient are given three things: Good news in the eternal realm is Allah's forgiveness, mercy and guidance (al-Makki, 2014:2).

Patience; It is the authority that provides control and control of the heart, and ensures that the soul is satisfied by bringing it to tranquility. According to the Sufis, it is possible for the soul to become pure through accounting and auditing and to extinguish its fire with patience. The fact that this soul reaches the place of consent after gaining the quality of mutmainne shows that it has reached the calmness and submission that the divine decree appreciates (Suhrawardī, 2011).

One bit of patience, which is one of the deeds performed with the heart, has been regarded as more virtuous than worshiping with limbs. Abu Uthman al-Maghribî stated that the best reward for worship is the one given to patience

[23]al-Baqara, 2/58, 86; Ali İmrân, 3/14, 152; an-Nisa, 4/66, 77; al-A'raf, 7/169; at-Tawbah, 9/91-93, 111; ash-Shuraa,42/10, 20; Muhammad, 47/20; adh-Dhariyat, 51/21; al-Hajj, 22/78; al-Hadıd, 57/20; al-Qasas, 28/54, 80; al-Haqqah,69/30-34; al-Muzzammil, 73/6, 8; Muddaththir, 74/1; al-Ahzab, 33/35; al-Qıyamah, 75/22-23; an-Naba, 78/21-26;an-Nazi'at, 79/37- 41; al-Humazah, 104/6-9.

and that there will be no reward above him; He based it on the following verse: "We will reward those who are patient with the reward we give to the best of their deeds."[24] Abu Ali Dekkak also stated that the patients will reach najat by being honored in the world and the hereafter, that the servants whom Allah has made friends with are patient and will receive the best reward (al-Qushayrî,1989; al-Makki, 2014:3).

Patience not only prevents despair, but also prevents opposition to the right by diverting the soul from laziness. This obstacle is related to the belief dimension of the religion. The duty of a person who is subject to the orders and prohibitions of the religion to believe in the power of patience while fulfilling his duty, eliminates the inactivity. According to Sahl, among the believers who harbor this weakness, the closest ones to unbelief are the people who are not patient. Therefore, patience gives a person an attitude by foreseeing avoidance of situations that are not considered appropriate by shari'ah. In addition to patience against trouble and misfortune, patience against the hardships of worshiping and persecution in the way of Allah is also important. Among the hardships of worshiping, patience against praying despite sleep and cold, and against fast and long periods of time can be cited as examples. Patience against the temptations of harams, as well as patience against the difficulties encountered while committing fard, is recommended. This is a situation that earns patience, honor, and good deeds, but is difficult to do properly.[25] Struggle in the way of Allah and patience is the recommended point against the suffering and cruelty of the people of the prophets.[26] Therefore, it is seen that patience is an element of psychological treatment in the protection of tolerance, empathy and hope against obstacles. This discourse is actually Sahl's "patience cleanser. It confirms the saying that "things can be cleaned with it"(al-Kalâbâdhî, 1994). Here, patience is to challenge the negative conditions that hinder spiritual development. Patience; the sign of salvation is the victory of perseverance. Patience is an example of an attitude that is sure of victory and that it heals people with a hasty nature:"Patience, observing the end of the job; impatience is being too short-sighted to see the end of the job. The first line is always left to those who see the end of things well. For example, Joseph enjoyed his nights even on the days when he was thrown into a well and kept in a dungeon. Because he believed it by seeing the moon, the sun and the stars prostrate in his dream"(Öztürk, 1990).

Patience is a transformation and educational activity at the point of achieving useful and necessary personality traits. Be patient; The way to comply with the truth is the driving force of taking pleasure from religion, not passive but active life. Patience for the Sufis; It is a level that prevents complaints, improves prayers, ensures endurance to sin, gives relief, relieves distress and must be achieved.

Conclusion

Patience, which is an obligation for every Muslim in the Quran and hadiths, is classified by the early Sufis as a rank and is generally classified as a triple classification. Sufistically, patience is a necessity and result of faith, as well as one of the most important steps to be reached on the way to becoming a perfect human being, one of the factors that increase the skill. The fact that the prophets and great people were patient people for the first Sufis shows that it is a moral and religious rule, and also shows that the degree of patience is proportional to the degree of skill.

Patience is seen as the virtue shown to misfortunes in the worldly life. Patience to reach different levels in Sufism; It is one of the moral qualities that carry feeling, knowledge and attitude. Along with misfortune, which is seen as the manifestation of the bond between the servant and Allah, prayer, blessing and patience against grants are among the attitudes that must be displayed. The first period Sufis defined patience in a close relationship with consent, ihlâs, submission, fakr, zuhd according to their own consent. The connection of these moral issues with patience is in worship, blessing, misfortune and gratitude.

For the first Sufis, patience is a prerequisite for literary preservation and exquisite struggle in any case. This struggle, which requires great effort and will, is patiently evolved. Patience; It is the means and the driving force of achieving the qualities that are desired to be acquired such as consent, ihlâs, submission, poverty, and asceticism.

Patience was classified by the first Sufis as haram and prohibitions, misfortunes such as worship, illness, and poverty. Patience, which is included in all of the first Sufism sources, was considered superior to all deeds by some Sufis. Therefore, the reward to be given in return for patience is considered more valuable than the reward of other deeds. The consciousness of waiting for the gateway from Allah stems from carrying the consciousness that the power is in the hands of the creator. For the Sufis, this consciousness is the realization that the servant's ability to follow the orders of his Master is patience. Therefore, achieving the purpose of patience is to take pleasure from misfortune and to consent to be the target of trouble arrows by the first Sufis.

[24]Nahl, 16/90.
[25] al-Baqara, 2/45.
[26] al-An'am, 6/34; al-Muzzammil, 73/10.

It can be said that patience has an effect on the nature of human behavior. Spiritual energy is required to overcome difficulties and to cope with the troubles of the world and this is patience. With the power of patience, one can get away from negative behaviors such as haste and anger, which are referred to as behavioral disorders. For the first period Sufis, moving away from the inclinations of the soul, being hopeful in the face of troubles, acquiring a habit of worshiping and not complimenting things other than God are important situations that require patience and provide salvation.

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Research Article

Exploring the constraints of space in enhancing giftedness of academics and administrative staff in higher education

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Abstract

This paper reports on a study that was conducted in Higher Education Institution (HEI) of Gauteng Province, South Africa. It forms part of a larger research project, which is "The dynamics of higher education space and place in Sub-Saharan Africa". The participants were randomly selected, and they were readily available. The aim of the study was to explore the perceptions and experiences of 17 academics, 4 administrative staff, and 1 chair of department, and 1 school director. This was a qualitative study that used interviews. In this paper the perceptions discussed are those of the academics and administrative staff only. The shortage of space in South African higher education institutions is a cause for concern; daily reports appear in the written and electronic media about the shortage of lived and conceived spaces. The findings suggest that space as a constraint in utilisation of higher education spaces is of serious concern in enhancing giftedness of academics and administrative staff in higher education spaces. And this is one of the internal factors that exacerbate poor performance of academics and administrative staff at the university. The study recommends that there is need to utilise space and policies effectively. A well-ordered HEI is also a less constraining environment. HEIs that experience problems of shortage of lived and conceived spaces need active academics, administrative staff, chairs of department, directors and policies that monitors space; recommends, redress enabling measures; and oversees policy implementation.

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Introduction

This paper reports on a study that was conducted in Higher Education Institution (HEI) of Gauteng Province, South Africa. It explored the constraints of space in enhancing giftedness of academics and administrative staff in higher education spaces. Van Alteren (2021) discovered that exceptional academics and administrative employees are capable of critical and creative thinking. They process information in a distinct way, and they can distinguish between irrelevant and important information, as well as transfer new information to previously acquired knowledge. Issue recognition, plan formulation, and self-monitoring are improved in gifted academics and administrative employees, making them good problem solvers. Space can also limit their ability to organize and work in a systematic manner. Despite a lack of clear evidence showing a connection with giftedness of academics and administrative staff in higher education spaces, many researchers have concluded that space should be available because of its potential to support. academics and administrative giftedness. Mtonga et al. (2021) believe that education and training play a key role as the human capital function. This is especially true for tertiary education. However, infrastructure and equipment limitations are some factors that limits levels of students' enrollment in universities. This is more so the case in the investigated university where much of the allocated space for offices seems to be limited and this is a constant problem that needs sophisticated approaches to deal with.

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Theoretical Framework

This study looked at the constraints of space in enhancing giftedness of academics and administrative staff in higher education spaces via the lens of contingency theory. Contingency theory posits that organizational efficiency can be reached by matching organizational features to contingencies that reflect the organization's condition, e.g. space (McAdam, Miller, and McSorley, 2019). They argue that common contingencies (also known as contingency variables) such as space and culture can be used to mitigate the constraints of space. From this standpoint, academic staff and administrative staff can enhance their giftedness by better fitting and aligning their defined set of contingency variables, to their defined set of contingency variables.

Literature Review

The functioning of universities is influenced by the constraints that act upon it and any changes in constraints may lead to changes in the organisation of the system. Constraints are the limiting aspects that influence institutions and can be classified into individual, environmental and task constraints (Renshaw & Chow, 2019, p. 108). Whitchurch (2019, p.680), found that academics and administrative staff can find ways of mitigating what many see as stringent special impediments. Whitchurch (2019, p.684) believes that increased need for additional space and time, such as for research, has become apparent. Academics, as a result, are vying for their own space and time. They apply for grants and sabbatical leaves in order to get away from the university's confined environment and, as a result, create space and time to pursue their research interests by taking academic leaves. However, one way to do so is to look outside the institution for what could be considered "free space," where people are less constrained by institutional norms and space. As a result, the intentionality associated with being an itinerant academic could be seen as a form of escape valve or channel, allowing one to move outside a structural cage and the power to adapt or oppose behaviors related to space limits.

Concerns about limited access to higher education spaces, particularly at selective public institutions, might be exacerbated when the majority no longer has the same real or perceived access to higher education as it did previously. The association between the proportion of racial/ ethnic minorities in a geographic area and compensatory responses by White inhabitants, known as racial or power threat, has been studied by academics. When faced with rises in either economic or political power threats by racial/ethnic minorities, particularly Black individuals, researchers have discovered that White residents engage in retaliatory actions—for example, public policies, racial attitudes—in general (Baker, 2019, p. 8). Due to space limits, Baker (2019, p. 201) discovered that states with a smaller number of White college-age citizens are more likely to approve a state affirmative action prohibition when focused on racial threat variables.

The distinction between elite, mass and universal systems of higher education. Eliteness is frequently depicted as a privilege enjoyed by some groups at the expense of others. The elite group receives social standing as a result of their power and prestige (Preece, 2019, p. 405). Tight (2019, p. 94) distinguished between elite, mass, and universal higher education systems. 'Elite' higher education systems enrolled fewer than 15% of the population; 'mass' higher education systems enrolled 15% to 50% of the population; and 'universal' higher education systems enrolled more than 50% of the population.

Despite the fact that diversity in admissions is an objective for all top tier institutions, wealthy families continue to have considerably more access to highly selective universities than less affluent families. While affluent families continue to dominate such institutions, selective postsecondary education has become a more competitive and, as a result, anxiety-inducing environment for present and aspiring elites. Each year, the most prestigious universities receive 30,000 to 40,000 applications, with schools like Harvard and Stanford accepting only approximately 5% of those who apply (Binder & Abel, 2019, p. 42). In some instances, affluent parents realized that they would have to put in more strategies to prepare their children to compete successfully for higher education admittance and, later, in the larger social system. "Maximally maintained inequality," in which parents encourage their children to pursue higher-level degrees (such as master's degrees on top of bachelor's degrees) in order to stay ahead of lower-income groups catching up in the educational credentials race, is one strategy used by wealthier segments. A second type of educational monopolization happens when privileged social groups engage in "successfully sustained inequality" by gravitating toward "more advantageous, selective, or prestigious portions" of the growing horizontally stratified higher education system (Ibid, 2019, p. 43). Academics and administrative staffs regularly experience inner and exterior limitations that drive their decisions, according to Weiss and Kivetz (2019, p. 519) in their real lives and in university spaces. The essay, on the other hand, focuses on choices imposed by internal restrictions, notably choices surrounding the utilization of space and location in universities.

Every process must include the road toward gifted performance, according to the developmental approach, which emphasizes the dynamic character of emerging skills. It should include domain-specific skill training and treatments, as well as self-regulated thinking, to reach high levels of expertise and exceptional performance independent of facility limits. From a developmental standpoint, both academics and administrative staff must consider cognitive and conative elements, as well as access to university facilities, to obtain exceptional results. Blumen (2021) revealed that despite their high levels of stress, young scholars from ethnically diverse backgrounds who were studying at a culture-sensitive university were engaged with their studies and maintained their academic achievement. Academics and administrative employees appear to be supported by the university. As a result, it appears that space/facilities and motivational processes are important determinants in the university's good performance of both academics and administrative employees.

Academics and administrative employees with high abilities can benefit or harm their psychological well-being by participating in university-based relationships and activities. When university space-based interactions are positive, academics and administrative employees, particularly those with exceptional ability, can maximize their potential. When universities create a safe environment for academics and administrative staff to develop proactive coping methods that allow them to enjoy life satisfaction, they have a better chance of achieving psychological well-being and academic success. Academics and administrative staff must be able to cope with stressors (such as space constraints) associated with university facilities to be motivated to work productively within the university spatial context. They must also have expectations of their ability to realize their potential regardless of the facilities available (Burkett-McKee, Knight, & Vanderburg, 2021).

People who have worked in the field of the talented have recognized that aptitude alone is not enough for success, and that other elements such as motivation, lack of issues, intellectual preoccupations, and suitable planning of educational institutions, such as facilities, are also important. Academics and administrative employees have a hurdle in this scenario because of the facilities. Poor information, insufficient time, a lack of physical space, and a lack of necessary abilities were all factors that influenced their poor performance on assignments. An option for enhancing engagement is to strengthen a sense of solidarity and social belonging among students, as well as for university administrators to provide cultural and social environments. According to the problems and issues raised by the talented students, things like forming expert groups of the talented for informing and counseling students about the development of research projects, scientific productions, or solving other educational and welfare problems by managers and university officials should be prioritized (Rahiminia, Yazdani, & Rahiminia, 2021). Factors like cheerfulness, resilience, self-efficacy, a good self-concept, excellent past academic accomplishment, and a supportive university atmosphere can improve the association between university facilities and giftedness. Social adjustment is essential in this piece to mitigate the limits created by university infrastructure (Schuur et al. 2021). define social adjustment as the ability to form satisfying relationships with others within the university, and emotional adjustment as the acceptance of one's personal spatial circumstances, which may include adapting one's attitudes and emotions in response to facility constraints. As a result, socially and emotionally well-adjusted accelerated academics and administrative staff in higher education should display adequate social and psychological responses to the university's space constraints.

Problem of Research

To determine the influence of space as a constraint in enhancing giftedness of academics and administrative staff in higher education spaces.The shortage of space in South African higher education institutions is a cause for concern; daily reports appear in the written and electronic media about the shortage of lived and conceived spaces. The question this paper explores is 'To what extent do we know the constraints of space in enhancing giftedness of academics and administrative staff in higher education spaces?

Method

Research Design

This was a qualitative study that used interviews and documents. The participants were randomly selected, and they were readily available to the researcher. The aims of the study were to explore the perceptions and experiences of 17 academics, 4 administrative staff, and 1 chair of department, 1 school director and the analysis of policies. The qualitative data from both the interviews and documents (policies) was re-analysed, more specifically to understand ways in which constraints of space were being translated in practice, and ways in which the dynamics characterising a diversifying workforce might be explained. The aim was to show how individuals were negotiating the more fluid constraints of environments in which they found themselves and negotiating the spaces in which they worked.

Participants

The participants were randomly selected, and they were readily available. The aim of the study was to explore the perceptions and experiences of 17 academics, and 4 administrative staff about the constraints of space in enhancing the giftedness of academics and administrative staff in higher education spaces.

Table 1.

Demographic Structures of Participants

		frequency	%
Gender			
	Male	11	52
	Female	10	48
Age			
	25-35 Ages	3	14
	35-45Ages	1	5
	46-55 Ages	5	24
	56-65 Ages	12	57
	66 + Ages	0	0
Administrative Position			
	Academics-Non-administrative position	17	81
	Administrative	4	19
Total		21	100

There were 11 males and 10 ladies among the participants. Academic posts were held by 17 people, while administrative ones were held by four people. The majority of the participants (12) were between the ages of 56 and 65. Five were between the ages of 46 and 55, one was 35 and 45, and three were between the ages of 25 and 35. Males took part in the study in greater numbers than females.

Research Instruments

Semi-structured Interview Form

The broad aim of the project was to look at the "The dynamics of higher education space and place in Sub-Saharan Africa". The objective of this paper was to look at the constraints of space in enhancing giftedness of academics and administrative staff in higher education. The research instrument was developed jointly by academics from the University of South Africa, University of Zululand, University of Zambia, Walter Sisulu University, Makerere University, University of Fort Hare, and the Vaal University of Technology. Seven experts investigated for content validity in the project.

The interview schedule consisted of 15 interview questions and the paper reports on questions 1 to 8. The selected questions are the following: (see Appendix 1)

- What are your experiences of the physical spaces within the institution?
- What are your experiences of technology within the institution?
- Who controls the utilization (and maintenance) of the physical and technological spaces?
- What is your role in ensuring that the physical spaces are enabling?
- Who do you think contributes to the constraints of the physical and technological spaces?
- What should be done to attend to the constraining factors about the physical and technological spaces? Who should do this?
- What should be done to enhance the enabling spaces? Who should do this?
- In your view, how do the physical and technological spaces relate to where the university is located?

Data Analysis

The statement of the participants was recorded using a tape recorder and their statements were transcribed verbatim. Thereafter, the statements were interpreted using interpretive paradigm to get meaning about the perceptions of the participants. Themes emerged from the statements and are explained under discussion.

Procedure

The research began in 2018 and it is continuing. The paper was compiled at the University of South Africa. This is an empirical paper that was compiled from a bigger study called "The dynamics of higher education space and place in Sub-Saharan Africa". The participant universities are University of South Africa, University of Zululand, University

of Zambia, Walter Sisulu University, Makerere University, University of Fort Hare, and the Vaal University of Technology. The paper used a qualitative technique, interviews and an interpretive paradigm.

Results and Discussion

This section presents the results that emerged from the interviews transcripts and the document analysis of the policies. The findings suggest that space as a constraint in utilisation of higher education spaces is of serious concern in a South African higher education institution and is one of the internal factors that exacerbate poor performance of academics and administrative staffs. At the researched institution some staff members are sharing offices and they don't have privacy. As for parking, this is a serious problem if staff members come late to work and they must park far from their offices and at times find their cars windscreens pasted with orange stickers if they have parked in those spaces that are not parking spaces. In one building the elevator, in most cases it was found that only one out of three elevators were working. It was found that the deanery management along with Chairs of Department are aware what the staff members are going through in terms of space, but they don't want to voice their opinions. The university has a large open space which can be used for building of new office space and parking area.

Theme 1. University Staff Experiences of the Physical Spaces

Competencies are domain-specific and heavily dependent on circumstance, according to Elatia and Ipperciel (2015). To put it another way, the context and environment will determine which ones should be used and how they should be adopted and applied. Choosing appropriate talents is heavily influenced by what is valued most highly by university stakeholders. The stakeholders involved in this process determine how competencies are used, implemented, and interpreted. Stakeholders are the driving force behind the deployment of skills from a pragmatic standpoint. They are, without a doubt, at the heart of the entire operation. University administrators, potential employers, students at various levels, professors at various ranks and with various duties, financing organizations, and government offices are all possible stakeholders.The participants are of the view that their experiences are terrible, because they are sharing offices and they don't have privacy, as for parking is a serious problem if they come late they park far from their offices and at times find the windscreen of their cars pasted with orange sticker. The parking space is also a serious issue that need to be probably addressed if they are not parking far, they find a sticker on their cars' windscreens and for them it is difficult to remove. At times their working conditions are tight, because there is not enough room for all their belongings and things. They find it unsafe as their cabinets have no keys to lock their stuff as some of them work with sensitive files (master's & doctoral students' files), and in other department some people are three in the office and its very crowded. Office space is a serious problem in the institution because staff are sharing and as they are sharing they are assigned to different tasks, as for some staff are sharing work with exam and assignment scripts and they work with master's and doctoral files, when it is time for assignments and examination periods about 20 000 scripts comes to their offices then they find their office space very small and the can't move around.

The major experience is that it is much of an inconvenience for them. Some other times you will find that the person that they have to share with is off a fixed term contract, in the next two or three months the person will be gone and then they have to adjust to another person coming in. That is why for some it is an inconvenience in terms of the physical part and also the emotional part. Physical spaces, because when they were appointed, some didn't have an office. Some remember when they had to report to the administrator's office up until they were sent to the library to go and report there, because they wanted to access the internet and at some stage they finally got some offices in a distant campus which is in another campus and during all that time, that physical space wasn't working well for some because they couldn't do anything with regards to their academic work.

Regarding the issue of space in an institution of higher learning to some staff members find that space in an institution where they are working, it is a big problem, because people are sharing offices, because it is an Open Distance e-Learning institution, where they need to have space but unfortunately because of the number of learners that have increased, people are staying in an office where they are double packing and they think the issue there is when they are double packing. It is not easy for them to bring out the quality of work that will enhance their giftedness because if someone is doing their work within the crowded office space, then, they disturb one another and currently the issue of the resources, they found that a whole crew of people they are using one resource. They would give an example, a machine, a photocopy machine was used by a lot of people and at the end of the day it would be costly because if each and every one was using that particular machine, it would be broken every time. So, the issue of space is a problem because it is not balancing the population of the building itself. In support of the findings in this paper, Sturtevant, Huebner and Waite (2021) confirmed the problem of space in their study titled: An Evaluation of On-Campus Lactation Spaces for Student-Parents". In support of the constraints of space, they identified two primary

challenges with space arrangement. First, the lactation rooms could become overcrowded. Many students had lunches and breaks around the same time, so rooms were in high demand during these periods. Second, while allowing multiple students to use the space simultaneously increased availability, this arrangement reduced privacy.

Theme 2. Experiences of Technology within the University

In the present technological environment, Vershitskaya et al. (2020) determined that e-learning is an important instrument that may be utilized to mitigate the problem of location. A hybrid combination of learner-centered e-learning, personalized courses, and audio/video online communications can alleviate the problem of student-teacher separation. E-learning has a significant impact on academic performance, particularly when it combines a variety of activities, such as aided learning, blended learning, and e-learning. As a result, in the education sector, learning management systems (LMS) are regarded as one of the tools for this type of learning. Similarly, Aras and Huber (2009) discovered that mobile access to the "Social Web" must take into account various contextual aspects and provide an understandable interaction paradigm in order to deal with large amounts of user-generated data in social networking applications. In support of Aras and Huber (2009), Absah, Karina, and Harahap (2021) discovered that educational facilities are tools and equipment that are directly used to support the educational process, especially the teaching and learning process, such as buildings, classrooms, tables, chairs, and learning tools and media, whereas educational infrastructure is a learning facility that indirectly supports the course of the educational or teaching process, such as campus location and transportation. Laptop and network were not a problem, the only problem they face is the elevator, because in most cases they would find that only one out of three elevators were working. Elevators are not working regularly as expected. Elevators are problems they do jam sometimes they have to take stairs from ground floor to the 7th floor and some of them have health issues they can't climb those stairs so the university should fix the elevators.Their ICT is bad, because their support staff with technology is not good, especially if they are called, the ICT people will always be in a phone for half an hour without any answer, they think in this category the university needs a lot of improvement . Parking is a disaster because sometimes they do find it sometimes they don't. They think each building must have a backup generator in case of cable theft.

With regards to network and computer they are happy. The technological spaces they would specifically be talking about the technology. How the system is programmed in terms of support, especially their section as academics. If they could be evaluating from one ten in that order, they would give it less than a 5. The reason, specifically for that was that every time when they would be having something to do with the technology, but one has to be working at or with, most of the times they would have the problems of access. So more than anything else it is a serious problem.

The experience also they wouldn't really say it is very good simply because been given a laptop that they can't use effectively sometimes, especially for their subjects was not really helping them to maximise their work. Nonetheless they are happy then because they have laptops allocated to them, there is technology that they can access. However, they would want to think that people would need to be trained around the campus. Some of their experiences was based on the technological space within the institution, some of the technological equipment, they can't reach them because if they need to print one copy, it takes some time to move from one office to another and it is very expensive, because if they move from here to the next level to go and do everything, it takes a lot of time and they lose whereas they would be doing something.

Theme 3. Control and Utilization of Physical and Technological Spaces

Waheed and Gilani (2021) conducted a phenomenological study to better understand PhD students' spatial experiences in universities, and one participant stated, "*This office provides me with the energy to live and work… This office, in a sense, protects me, and I feel secured while being with my colleagues. I own this office and it owns me.*". in the same study a question was posed to another participant "What is it like for you being and working in this place"? He was sitting in his laboratory and remarked that: "*I am sitting in this small corner of my office, which is not ideal for work. I feel like an isolated person here. I don't think there is something that can stimulate me. Nevertheless, this is a worthwhile place for me because I would not be so active and fall asleep if I worked at home. Although, I am not in contact with most of the colleagues working here*". At universities, space management is extremely crucial. It was shown that lecturers' capacity to encourage active engagement from students is required for students to retain lecture materials more effectively (Absah, Karina & Harahap, 2021). Mtonga et al. (2021) discovered that the survival of universities is heavily reliant on the income generated, and that tuition fees are a consistent and reliable source of income for the institutions; therefore, available infrastructure must be put to the best possible use to maximize income generation. For the control of technological spaces, they think ICT was responsible and physical space the University Estate is responsible and there is a problem.

At the moment they cannot just be specific for giving names, but they know that for technology they talk of ICT that would be a senior, an acronym that they usually use and for physical space they wouldn't even know.

In some departments, those who control space are the Heads of department and the senior administrators, and it was up to them to decide, because there are people who are appointed they have applied but knowing that they are coming, but when they come, they will find that there are not laptops to be given to them. So that kind of space controlling is with their office or vicinity.

The university itself is the one that is controlling space and also it makes it a point that at the end of the day university needs to maintain that but remember that what the participants said before is that space was used by a lot of people, one equipment for a lot of people. Then it would affect the institution directly or indirectly.

Theme 4. Enablers of Physical Spaces

Systems are the formal and informal aspects that enable the delivery of an online (OL) strategy, and their structure must incorporate technology (Internet connectivity and learning device availability) as well as support for online platforms. While students had access to free Wi-Fi through university hotspots throughout their time on campus, other students may not have Internet connectivity at home. Students suffer technical issues at home when navigating through OL platforms, in contrast to traditional teaching where students gathered in a setting and had access to instant support from educators (Roslan & Halim, 2021). Administrative employees are required to perform well, be capable, dependable, and willing to carry out their responsibilities by following good and efficient procedures and methods and completing work regularly and precisely. Administrative employees must demonstrate speed, responsiveness, polite and learned behaviors and appearances, a display of trust and conviction, and true attention to every element that demands their assistance in their task (Absah, Karina & Harahap, 2021). There is nothing the participants as administrators could do, because they think if the university cannot appoint people responsible to deal with the matter of physical spaces. There are professors who are working from home who don't have offices on campus. They do sometime accommodate them in their offices and clear their desk for them to work for those few hours. They don't play any role as administrators, but they think people who should is University management and University estate to ensure that all staff fit in and there is no space problem. The role that some administrative staff are playing is to make sure that the information is escalated to the people who are in charge. Now recently in 2019 some staff members were complaining as colleagues in their departments to say that the ICT system was failing them, and they then wrote a memo with the advice of their Head of Department to the ICT to say that academics are experiencing specific problems that relates to ICT and the role that they have played so far, is to escalate their concerns to ICT department. The participants were of the view that the absence of proper training at different levels can help them. The staff members think that their role is to make sure that they deliver what they are supposed to deliver as per requirement of their contracts, and in actual fact, what they need is to have the space that they will be able to utilise. Now they don't have that particular space. The increased emphasis on auditing academic teaching space, the rapid expansion of the student population, and the introduction of new technologies; a wide range of teacher education educators' and to mainstream physical, discursive, and relational conditions the university provides have all influenced academics' practices, according to Santos and Soler (2021).

Theme 5. Causes of Constraints of the Physical and Technological Spaces

According to Sorathia and Joshi (2009), social networking websites allow individuals and groups to engage with one another through chat rooms and share personal information, ideas about a topic, and get to know new people. This means that, while being a student at a university, you can make friends from other universities, learn about other cultures, learn new languages, and so on. They also recommend that a number of websites and mobile applications be devoted to establishing friends, professional contacts, mobile chat, picture-video sharing, instant messages, photo blogging, mobile gaming, and communicating with students and coworkers, among other things. Mobile devices are pervasively connected to the global network as well as to people as a result of technical advancements in recent years. Social networks have migrated to the mobile platform as a result of the development of location-based services and the increased adoption of mobile devices such as cell phones, gaming machines, and handheld computers by a wide range of users. The participants believe that the deanery management along with Chairs of Department know what they are going through, but they don't want to voice their opinions. The number of staffs are increasing, and the availability of resources is limited and all of them cannot work effectively on one system because it would start freezing and this cause delay in production. Everyone within the university contributes to the constraints of both physical and technological spaces, the staff of the university are so many but with few offices. All of them relied on one system and when the system is down they all go home, and another day is wasted. They would not specifically point to a particular person, but every time when they go to, for an example to ICT people, more than anything else, there is that element of people in terms of their appointment contracts, so more than anything else they feel that they cannot do more than what they can do in terms of what is available to them.

They wouldn't say who must do what, but they would say all of them need to really do something, like for example if they know there are people that are coming to join the university, definitely there should be space for them to occupy, physically and have a space and the technology should also be enhanced to such that it is user friendly to people. The newly appointed people have to be trained on the use of myUnisa and many other ICT tools that are available. The newly appointed people should be trained in using Podcasts and all the things related to ICT, because UNISA is an ODL university. The participants think that the physical planners in the institution never planned it ahead, because if they had planned ahead, the issue of space won't be a problem, but they failed to plan it ahead. If the university increases the numbers of learners in an institution it means that they need to increase the resources itself. Learning spaces, according to Pawlicka-Deger (2021), are "places of engagement where often disjointed thoughts and ideas, that have been inchoate, begin to cohere as a result of the formation of some kind of suspension from regular life." Staff typically perceive that their notions of learning, teaching, knowledge, and identity are being questioned in such places, and they realize that they must decide how they will respond.'

Theme 6. Constraining Factors about the Physical and Technological Spaces

Poor infrastructure has a negative impact on teaching, research, learning, and students' health and safety, according to a study by Oghiagbephan (2017). The quality and quantity of human and material resources put in place in institutions of higher learning determine the quality and quantity of higher education. The quality of education in universities will be harmed by a lack of infrastructure such as office space, student hostels, libraries, and electricity. The institution has large open space they think it should be used for building of new offices space and parking lot. The university should look at other options, maybe for those who are not sharing must start sharing, but they must make it limited like two people per office and as far as technology their system need to be upgraded on a constant basis, as technology keeps changing and the system must also keep up with those changes because they are trapped on this old windows and they find that there was already latest models of soft wares that was outdated but they still trapped in this *old version.so system* need to be modified on a regular basis and they are talking about the speed of the internet. For example, some for instance at the banks they use fingerprints and the data comes up, stuff like that the university needs to look into it. They know that it's expensive, but it can help a lot. Firstly, of all the university must provide those staff members who are sharing with the big offices and build new office space on the campus as they do have enough open space which was not used. Those who work with the exam scripts must be given their own offices since the number of modules in the departments has increased. There must be a committee that works with the problem of office space and the allocation of offices to staff members. Elevators must be updated and serviced on a regular basis or even replaced if possible.

The participants think more than anybody as they want to believe it is cyclical wherein they have different components and from the components they would have systems that are put in place, but what they know is that all the system to function properly, every other component has to be in play, then they would be talking about quality for the institution. They believe that the spaces to be enabling they should be maintained. To be sustained and then they would want to feel that every individual in his or her own spaces are responsible for that. They suggest that there is a need to make sure that the ratio of the learners, go hand in hand with what the staff provisioning have. So, the management of the university should make sure that at the end of the day things are balanced in the institution in terms of space . They believe that there is a lot of imbalances. Peimani and Kamalipour (2021) found that space for developing core professional qualities among students, such as communication, interpersonal, and practical skills, and maintaining student retention rates, as well as training and support to effectively use online technologies and address technical issues and cyber security risks, are seen as major challenges for online education.

Theme 7. To Enhance the Enabling Spaces

Mtonga, Twahirwa, Kumaran, and Jayavel (2021) discovered that the problem in higher education may be divided into three subproblems in the education domain: space allocation, new student allocation, and students' projects allocation. The challenge of space allocation entails allocating resources to specific space locations, such as office space, in order to meet varied demands and limits. The goal here is to guarantee that no space is wasted or overused. The placement of students into classes to match the capacity in the relevant classes is a new student allocation problem. The capacity of each class and assigning students with the same rankings to the same classes are two examples of hard limitations to meet in this problem. Student project allocation refers to how to allocate a student to a case while keeping both the student's and lecturer's capacity limits in mind. According to Denney (2021), higher education employees are increasingly switching between professional and academic jobs in order to progress their careers in academia, as well as taking on new and emergent quasi-academic roles in response to rising student numbers. Rather than being bound by the traditional academic structure, individuals in the industry are increasingly likely to develop their own portfolio

career based on their own choices. Furthermore, employees of all ages and types are becoming increasingly desirous of flexibility, which aligns well with the institutions' need to cover more services over longer periods of time. Each college must assign one or two people and create committees that deals only with the spaces. The university needs to get people to come and enhance the staff members' offices, come and check what needs to be done in the offices, how they can fit everyone in. The university is advised to appoint people to enhance spaces in and out of office, committees for spaces must be created and matters should be resolved. They think they have management at different levels, so they would say each unit in terms of responsibilities of management should be able to take care of what it is supposed to be doing. Some of the participants are not sure what to do to enhance space at the university because as an Open Distance e-Learning institution, many a times the staff members are dealing with people that they can't even see. So, in their view some participants suggest that policies and rules for both academics and students should be in place and adhere to. The participants advise that the university needs to make sure that everything that is here for now, to make sure that they enhance them, and these things should be done by each and everybody in the university. Not a certain people who do 1, 2, 3, 4, but the issue here is to make sure that at the end of the day, everybody is having resources and the space where they can work in.

Theme 8. Physical and Technological Spaces Relate to Where the University is Located

According to Absah, Karina, and Harahap (2021), online learning allows students to maintain their learning processes while having more flexibility in their schedules. Some students, however, believe that online learning is more difficult than traditional learning because of issues such as internet data quotas, network stability, laptop availability, better understanding of learning materials compared to face-to-face meetings, university readiness to provide online learning facilities and infrastructure, and partial readiness of lecturers and students in operating online learning systems quickly, such as preparing digital lecture materials.The participants believe that where the university is located is fine, because there is a lot of space for new development and enough space for building offices. The university is located at the right place is just that there is a need to place out staff correctly. It was found that there are people who are not sharing offices and it is suggested that those people can also share like others they think it won't be a problem and other problems comes with the contract people (staff). It was found that some of the contracts are not renewed and those people leave, and the space was made available. So, the university will never have a fixed number as to how many people belong to an office, but if the people are permanent then it will be known how many people are placed in the university offices. And the university statistics won't change because the university will know that people are placed permanently and there is space then they can work around who is based where permanently. To the participants, the physical and the technological space, refer to the institutional place. To them the university where is located is fine, but the context that the university needs is to make sure their programs are of good quality to the students, because the university has a challenge of space. Kim and Kutscher (2021) believe that the location of the university is very essential. Although higher education institutions frequently regard students with disabilities as a group, students with different disability kinds have varied requirements and so face different hurdles to postsecondary achievement and growth. Students with visible disabilities (e.g., sensory disabilities, physical disabilities) and students with less visible disabilities (e.g., learning difficulties) may experience different obstacles in higher education spaces.

Conclusion

This paper investigated 'To what extent do we know the constraints of space in enhancing giftedness of academics and administrative staff in higher education spaces?' From this main research question, an overall conclusion on the study was that the university will never have a fixed number of staffs in offices, but if the people are permanent then it will be known how many people are placed in the university offices. And the university statistics won't change because the university will know that people are placed permanently and there is space where they can work. Regarding the issue of space some staff members found that space at the university is a big problem, because people are sharing offices. Findings in this study highlighted that space as constraints in utilisation of higher education spaces is of serious concern in a South African university and is one of the internal factors that exacerbate poor performance in academics and administrative staff. Because of contracted staff instead of being permanently employed, the university will not have a fixed number of staffs in offices. But if the people are permanently employed, then it will be known how many people are placed in the university offices.

The justification of the main conclusion is based on one insight which highlighted that recently in 2019 some staff members were complaining that the ICT system was failing them. The results are similar to Renshaw and Chow (2019) findings that constraints are the boundaries that shape self-organisation and can be separated into categories, such as, individual, environmental and task constraints. The university is located at the right place is just that there is a need to

place out staff correctly. It was found that there are people who are not sharing offices and it is suggested that those people can also share like others. The university needs to get people to come and enhance the staff members' offices, come and check what needs to be done in the offices, how they can fit everyone in. The university is advised to appoint people to enhance spaces in and out of office, committees for spaces must be created and matters should be resolved. Those who work with the exam scripts must be given their own offices since the number of modules in the departments has increased. There must be a committee that works with the problem of office space and the allocation of offices to staff members. Elevators must be updated and serviced on a regular basis or even replaced if possible. Everyone within the university contributes to the constraints of both physical and technological spaces, the staff of the university are so many but with few offices. All of them relied on one system and when the system is down they all go home, and another day is wasted.

Limitations of the Study

The study represents a snapshot of constraints of utilisation of space, and although it is not possible to make broad generalisations from the numbers involved, it is likely that they are indicative of trends in South African Higher Education Institutions. The report is about an investigation in one institution of higher learning.

Recommendations

The study recommends that there is need to utilise space and policies effectively. A well-ordered HEI is also a less constraining environment. HEIs that experience problems of shortage of lived and conceived spaces need active academics, administrative staff, chairs of department, directors and policies that monitors space; recommends and redress enabling measures; and oversees policy implementation. Enabling environment should be created for staff through improved conditions of service, provision of basic infrastructures, and information communication technologies and internet connectivity.

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Appendix 1.

Semi-structured Interview Questions

Semi-structured Interview Questions

Q1. What are your experiences of the physical spaces within the institution?
Q2. What are your experiences of technology within the institution?
Q3. Who controls the utilization (and maintenance) of the physical and technological spaces?
Q4. What is your role in ensuring that the physical spaces are enabling?
Q5. Who do you think contributes to the constraints of the physical and technological spaces?
Q6. What should be done to attend to the constraining factors about the physical and technological spaces? Who should do this?
Q7. What should be done to enhance the enabling spaces? Who should do this?
Q8. In your view, how do the physical and technological spaces relate to where the university is located?
Q9. What are you passionate about as an administrator?
Q10. How do the social relations at the institution enable the growth of this passion? Or your development as an administrator?
Q11. How do social relations in the institution constrain your development as an administrator?
Q12. What would you attribute to the cause of these enabling (and/or constraining) social factors?
Q13. How might the enabling factors be enhanced or consolidated for sustainability?
Q14. How do XXXX policies and rules enable your development?
Q15. How do they constrain your development? Possibilities of learning

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Research Article

Teachers' needs for instructional support at early number sense: analysis in terms of (lens) the concerned based model for teacher development

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Abstract

Early number sense requires teachers to have explicit knowledge and understanding to develop learners' skills and knowledge of early number sense. Early grade teachers play a critical role in ensuring learners develop appropriate number sense. The South African National Curriculum Statement allocated 65% of time towards teaching Numbers Operations and Relationship which forms the basis of number sense. Most South African teachers in the early grades are not mathematics specialists and are dependent on support from their school's head of department and the subject curriculum specialist from the district offices. This paper explored teachers' experience of the support they received from their head of department in the early grades and the curriculum specialist for the Foundation Phase. This study used the qualitative approach and Fuller's Concerned Based Model for Teacher Development as a theoretical lens to investigate the phenomena. This was a single case study research conducted at one school in the Gauteng Province with three Foundation Phase teachers, one head of department and one subject advisor. Findings revealed teachers understanding and knowledge of number sense and their ambivalent views regarding the support they received. All teachers concluded that the support they received from their department head and subject advisor were partially beneficial to them. They were very concerned with level and depth of the training provided to them. They were unhappy with the once-off short training. Teachers recommended they needed more intensive training on pedagogical content knowledge and content knowledge. Professional development training should be ongoing and that the network learning communities should be established in each district.

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Introduction

South Africa is one of the participants in the Trends in International Mathematics and Science Study (TIMSS) that assess learners' mathematics and science knowledge globally. The 2019 TIMSS results revealed that South Africa was one of the five lowest-performing countries in mathematics globally (Human Science Research Council [HSRC], 2020). The poor performance of South African learners is well documented in the Annual National assessments [ANA] (Department of Basic Education, 2011a) and the TIMSS. The TIMSS and the ANAs highlighted number sense as a significant problem experienced by most learners. The reasons cited for the poor performance is due to mathematical content knowledge and mathematics teaching practices (Morrison, 2013). Moloi and Chetty (2010) believe that to improve the mathematics performance of learners, there is a dire need to increase teachers' content knowledge through appropriate and effective mathematical support. This would raise the level of mathematics teaching and learning in South African classrooms. Table 1 below is an excerpt from the TIMMS 2019 result.

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Table 1.

Ranking of South Africa by 2019 TIMMS Mathematics Average Scores

Country	Mathematics mean (SE)
Singapore	625(3.9)
Hong Kong SAR	602(3.3)
Korea, Rep. of	600(2.2)
Morocco	383(4.3)
Kuwait	383(4.7)
South Africa	**374(3.6)**
Pakistan	328(12.0)
Phillippines	297(6.4

Source: TIMSS 2019. Highlights of South African Grade 5 Results in Mathematics and Science

The table is an excerpt from the TIMMS 2019 results which presents the top three countries which are all from East Asia, Singapore (with an average scale score of 625), Hong Kong (602) and Republic of Korea (600). The three countries with the lowest achievements were South Africa (374), Pakistan (328) and the Philippines (297), with the South African achievement score significantly higher than Pakistan and Philippines.

For this study, the author asked the question**:** *How are foundation phase mathematics teachers supported to raise mathematic teaching and learning levels, especially number sense?* The DBE has developed t*he National Policy Framework for Teacher Education and Development in South Africa* (DBE, 2006). According to this policy, teacher education in South Africa is designed to develop a teaching profession that is ready and competent to cater for the South Africa's population. This policy highlights the need for continuing professional training and development, and it emphasises conceptual and content knowledge and gives prominence to pedagogical knowledge for effective teaching and learning. Despite the DBE's vision for teacher development, the level of support teachers receive in teaching number sense has met with ambivalence. This qualitative study explored teachers' experiences in the foundation phase who are responsible for teaching early numeracy skills. It also explored the kinds of support they (teachers) received from the various stakeholders: heads of department and the curriculum subject advisor.

Number Sense in the Foundation phase

Early numeracy skills are critical and relevant for learners' mathematical development at school, especially in the early grades when much mathematics learning relies on early numeracy competencies and understanding. Early number sense includes learned skills that involve explicit number knowledge. Number sense is defined as a learner's general understanding of numbers, operations and relationships (Department of Basic Education, 2011b). Van de Walle, Karp and Bay-Williams (2015) describe number sense as a complex phenomenon – an individual's skill to use, recognise and manipulate numbers by understanding and knowing their relative values.

Early grade teachers play a crucial role in strengthening young learners' knowledge and understanding of number sense; however, most teachers experience various challenges in teaching early number sense within the South African context. According to Whitacre, Henning and Atabas (2017:205), early number sense includes "learned skills that involve explicit number knowledge, such as counting items, using number words and comparing numbers represented symbolically as a numeral." In the last ten years, there has been much emphasis on developing appropriate early numeracy skills and their relevance for later mathematics learning. To support and improve mathematical knowledge and skills the DBE's (2011b) National Curriculum Statements [NCS]: Curriculum and Assessment Policy Statement [CAPS]: Mathematics Foundation Phase ensure that the mathematics curriculum covers five content areas. The table below highlights the content areas and the weighting of each area for each grade in the Foundation Phase.

Table 2.

Weighting of Mathematics Content Area in Foundation Phase

Weighting and Content Areas	Grades		
	Grade 1	Grade 2	Grade 3
Numbers, Operations and Relationships	65%	60%	58%
Patterns, Functions and Algebra	10%	10%	10%
Space and Shape (Geometry)	11%	13%	13%
Measurement	9%	12%	14%
Data Handling (Statistics)	5%	5%	5%
Total	100%	100%	100%

Source: DBE (2011b) CAPS

The policy stresses that in the early grades, it is of great importance that the content area Numbers, Operations and Relationships (of which number sense is embedded) is the main focus of mathematics. All learners must leave the Foundation Phase with appropriate knowledge and understanding of number sense and its operational fluency. The policy expects all learners to be competent and confident with numbers and calculations. For this reason, there is an increase in the notional time allocated to Numbers, Operations and Relationships in comparison to the remaining four content areas (DBE, 2011b:10).

Unfortunately, many children across the country do not have ample opportunities to learn and practice early numeracy skills in an acceptable manner (Aunio, Mononen, Ragpot & Tormanen, 2016) due to various reasons. Venkat and Spaull (2015) believe that the poor performance in mathematics among South African learners is due to teachers' mathematical competencies and knowledge. Other reasons cited for the poor performance can be related to professional teacher development, qualifications and the lack of ongoing support to teachers. Spaull and Kotze (2015) state that these were evident in the national and international assessment reports, which highlighted the reasons for the performance of many learners below the expected grade level in the first years of primary schooling.

Teachers Pedagogical Knowledge Content and Ongoing Professional Development

There has been much emphasis and recognition for the importance of teachers' mathematical subject knowledge. For good teaching and learning to occur, teachers must have sound pedagogical knowledge and subject matter knowledge. This knowledge impacts learners' learning and understanding of early number sense. Briand-Newman, Wong and Evan (2012) state that pedagogical content knowledge (PCK) has been acknowledged, accepted and recognised by researchers and practitioners as an essential factor for improving students knowledge, understanding and achievement. Shulman (1986, 1987) states that pedagogical content knowledge is the knowledge that is exclusive to teachers and is based on how teachers relate what they know about teaching (pedagogical knowledge) to what they know about what they teach (subject matter knowledge). Briand-Newman et al. (2012) state that Shulman's conceptual framework incorporates seven categories of teacher knowledge of education contexts, the purpose of education, content knowledge, curriculum knowledge and pedagogical content knowledge.

Research by Tsao and Lin (2012) found that many teachers exhibit weaknesses in mathematical understanding, incorrectly apply mathematical rules, lack knowledge of the true meaning of mathematical concepts, and are often unprepared to teach the mathematical subject matter given to them for which they are responsible. Venket and Spaull (2015) also identified similar findings among South African teachers, who found it challenging to identify the barriers experienced by learners and how to adapt their teaching to address these barriers. Kathirvello, Puteh and Matematik (2014) agree that PCK plays a significant role in the teaching and learning of early mathematics and classroom instruction. They agree with Briand-Newman et al. (2012) that PCK involves teachers' competencies in delivering conceptual approach, relational understanding and adaptative reasoning of the subject matter. It is vital that teachers possess the capacity to transform the knowledge to be taught to learners to be easily understood. To effectively teacher number sense in the early grades, teachers must be skilled, knowledgeable and have deep insight into the subject matter. According to the DBE (2006) and the National Council of Teachers of Mathematics (2000), teachers must be professionally developed and capacitated to adapt the curriculum to teach mathematical concepts effectively. Effective teaching requires knowing and understanding mathematical content, which can happen through ongoing professional development.

Continuous professional development of teachers is viewed as an influential central factor for the efficiency of teaching and learning. Blomeke and Delaney, cited in Schwarz and Kaiser (2019), found a correlation between professional development and students' achievement. Teachers who attended ongoing professional development and support effectively adapted their teaching and learning to accommodate learners. Braseth (2021) argues that leadership plays a significant role in teacher learning. During the 'teacher learning process' (professional development), they found that mathematics teachers changed their focus from passive and reserved individual to more active involvement and collaboration in the practice-based development programmes.

For an effective change in the classroom environment, it is necessary to design a quality and focused teacher-professional development programme. These programmes should be well-planned and coordinated to ensure that teacher development is an ongoing process, rather than a once-off training. Pokhrel and Behera (2016) agree that teachers must become actively involved as their continuous growth depends on their efforts.

Theoretical Framework

A theoretical framework provides an overview of perspectives and research results regarding the proposed topic (Ferreira, 2012). Fuller's Concerned-Based Model of Teacher Development (CBMoTD) was used as a theoretical

framework for this paper. This framework provided the lens through which teachers' concerns are noted and acknowledged so that they can be supported to teach number sense in the early grades.

This model, developed by Fuller (1969), identifies three stages of teachers' concerns regarding teacher development. These are teachers concerns about the self – this reflects on their knowledge and understanding of number sense in the early grades; concerns about the task – this refers to their ability to transfer content and pedagogical knowledge to learners and finally, concerns about learners and the impact of their teacher – this refers to the effect of their PCK and CK in teaching learners about number sense for gain a deeper understanding of mathematical concepts.

Further clarification of the three stages are as follows: (i) *Self-concerns* summarise how teachers view themselves in their teaching and learning environment. A question that teachers often ask in this section is *"Do I know how to teach number sense in the early grades and do I have the experience to implement the CAPS curriculum?"* When teachers do not know how to implement and teach number sense concepts, it will negatively affect learners' acquisition of early numeracy skills and understanding, negatively impacting them as they go into the higher grades. The study aims to determine how teachers are supported by their heads of department and curriculum advisors to teach number sense concepts in the early grades effectively. (ii) *Tasks or situation concerns* focus on the everyday task and duties of a teacher (Veldsman, 2018). Questions that arise are "Am I equipped with sufficient knowledge and understanding to teach number sense in the early grades?"; "Do I understand the pedagogical content and subject matter knowledge?" and "*Did I plan this lesson consciously for success?*" The daily responsibilities should be set out in the planning through appropriate and ongoing support from the head of the department and curriculum subject advisor. (iii) *Concerns of impact on learners' learning* include teachers' abilities to support learners to reach their full potential (Fuller, 1969). Questions that could be asked are "*How can I support learners who experience a barrier to learning mathematics?* " and *"Do I know how to support learners who experience challenges in the early number sense*? "

Fuller (1969) and Conway and Clark (2003) agree that these three stages should be viewed as a general movement that progresses from one stage to the next. Therefore, early grade teachers, head of department, and the curriculum subject advisor must have good content and pedagogical knowledge of the subject matter (number sense). According to Franey (2016) and Veldsman (2018), this model aims to identify and eliminate teachers' concerns regarding the successful implementation of the content area Numbers, Operations and Relationships.

To start with, the first focus is on the different phases of the concerns faced by teachers in teaching number sense in the early grades. Conway and Clark (2003) argue that researchers who implement the CBMoTD usually adopt this model to ensure that teachers are provided with the necessary support to ensure effective and efficient content delivery to learners. Since this study aimed to support teachers to effectively and successively teach number sense in the early grade, this model is appropriately suited for this study. According to Fuller (1969), this model can be seen as a successful theoretical model since it continuously engages with teachers to identify their needs to improve the quality of teaching and learning.

Research findings by Vermunt (2009) and Veldsman (2018) explained that teachers are more concerned regarding the lack of professional development and ongoing support to improve their teaching pedagogy. This framework provides an opportunity to build capacity amongst teachers to teach mathematical concepts with appropriate knowledge and confidence. This model creates the opportunity for teachers to be self-reflective and articulate their needs for ongoing support; reflect on how they are presenting their lessons in their classes and finally evaluating the effectiveness of their teaching and learning through the support they have received from their head of department or the curriculum subject advisor.

Aim and Problem of Study

The study's primary purpose was to explore the kinds of support early grade mathematics teachers receive from the heads of department and curriculum subject advisors in teaching early number sense and their knowledge and understanding of the phenomena. This study focused on Foundation Phase teachers in one district in the Gauteng Province in South Africa. The study was explored through the Concerned Based Model for Teacher Development (CBMoTD) lens. This model postulates that teacher development in early grade mathematics is crucial for quality teaching and learning, which impacts later mathematical success.

Methods

Research Model

It was agreed that the qualitative research method was most suitable for this study. It allowed for the description of the participant's responses, providing an in-depth analysis of the phenomenon using an interpretivist research

paradigm (Maree, 2017). The researcher opted for the descriptive design since it aims to accurately and systematically describe lived experiences of the support received and given to teachers by the head of department and curriculum subject advisor. Creswell (2014) states that descriptive research aims to answer what, where, when and how questions; and in this study the researcher asked the following questions: what kind of support did teachers receive; how often did they receive the support; what are the participants qualifications in mathematics, their knowledge and understanding of number sense.. Both the head of the department and the curriculum advisor were asked similar questions to that of teachers. The descriptive design allowed the researchers to gain a detailed account of the support teachers received to capacitate them to teach number sense in the early grades. A single case study approach was used; since the study focused on a particular phase and cohort of teachers in one district (Gustafsson, 2017).

Participants

The participants in this study consisted of three (3) teachers, one from Grade 1, 2 and 3 and the head of department from the same school. One (1) curriculum subject advisor was purposively selected from the Tshwane West district office since she was responsible for providing support to the teachers at the school. All the participants were from Tshwane West District in Gauteng Province. The participants were purposively selected with the following inclusion criteria: all teachers had to teach in the Foundation Phase in grades 1, 2 or 3. They had to be professionally qualified with a degree or diploma in Foundation Phase teaching; they must have experienced some support from both the HoD and subject advisor during their years of teaching and they had to have attended workshops organised by the subject advisor. The subject advisor had to be responsible for supporting the selected school. For the purpose of anonymity and confidentiality, Table 3 below indicated the codes used for each participant; for example T1-F refers to T- for Teachers; 1 – for Grade 1 and F – for Female.

Table 3.

Structures of Participants

Participant No	Gender	Age	Code
Teacher 1- Female - Gr1	F	42	T1-F
Teacher 2 – Female - Gr 2	F	40	T2-F
Teacher 3 – Female Gr 3	F	45	T3-F
Head of Department – Female Gr 3	F	48	H1-F
Subject Advisor – Female	F	47	SA1-F

Data Collection Tools

The researcher used a semi-structured open-ended interview schedule (Appendix 1) and document analysis as the data collection tool in this study. The researcher also analysed the following documents: teachers' planning files; DBE Rainbow workbooks, the Gauteng learner workbooks and the CAPS policy document.

Semi-structured Interview From

The researcher developed the semi-structured interview form. The semi-structured interview form collected asked questions about the kinds of support teachers received, their knowledge and understanding of number sense, their qualifications and frequency of the support. In developing the semi-structured interview schedule, the researcher followed the guidelines proposed by Maree (2017), that questions should be open-ended to allow participants the opportunity of sharing their lived experiences; use language that the participants can understand; avoid negative or leading questions and keep questions as short as possible. To ensure validity of the questionnaire, it was presented to two staff members in the Early Childhood Education department to critique and advise whether the questions were clear, concise and unambiguous. There were no serious modifications which indicated that the instrument was considered valid for the study (See Appendix 1).

Data Analysis

The researcher used Creswell's steps in data analysis. The data were transcribed and analysed. After that, the data was organised into sections. Patterns were identified in the information which was organised in themes (Creswell, 2012). These were shared in this study below.

Ethics

Ethics approval was granted by the ethics committee of the University of Pretoria and the Gauteng Department of Education. All participants were formally invited and signed the consent forms agreeing to participate in this study. They were informed of voluntary participation and were not obligated to remain throughout the study. All five participants consented to participate in the face-to-face interview. They were guaranteed anonymity and confidentiality

of their participation. They were informed that during the reporting phase, pseudonyms would be used. The table above presented the codes used in the findings section of the study.

Procedure

The researcher conducted one group interview of approximately 40 minutes with the three teachers and two individual interviews with the head of the department and the curriculum subject advisor. Separating the interviews allowed teachers to express their views confidently and without feeling intimidated by their head of department and the curriculum subject advisor. Teachers felt that they would not be comfortable and free to articulate their views in the presence of their senior managers. Interviews took place during April-May 2019 at the schools where the staff were employed. All interviews took place after school hours to prevent disrupting class time. The interview with the subject advisor was arranged and the researcher and the subject advisor met at the school.

Results

This study aimed to explore how Foundation Phase mathematics teachers were supported to raise the levels of mathematics teaching and learning of number sense. Emanating from the interviews, two (2) primary themes emerged:

- The importance and understanding of number sense in the early grades
- Teachers' views of the support received from the HoD and Subject Advisor

Verbatim quotes have been used in sections.

The Importance and Teacher's Understanding of Number Sense in the Early Grades

A young child's early experience and understanding of mathematics lay the foundation for later mathematical success. Mathematical knowledge and skills encourage learners to think logically, strategically, creatively and critically (DBE, 2011). Therefore, the importance of early number sense (mathematical knowledge and skills) cannot be overemphasised in the formative years. Many researchers argue that number sense is a significant construct that separates superficial understanding from subject mastery. With this information as background knowledge, the researcher posed the question to teachers, HOD and subject advisor on the importance of number sense and their understanding of number sense in the early grades.

All the participants T1F, T2F, T3F, H1F and SA1F agreed that early number sense is an important focus area of mathematics teaching. They indicated that without a sound understanding of number sense, learners will not be competent and confident in mathematics in later grades. They all agreed that if learners do not have a good foundation of early number sense, then these learners will always experience barriers in mathematics in higher grades. Number sense forms the basis of all mathematical teaching and learning. For these reasons, the CAPS document also mandate teachers to place much emphasis on early number sense.

T1F stated,

> "*As a grade 1 teacher, I place a lot of emphasis on teaching the understanding of basic numbers and their values. I emphasise rote counting at the beginning of the year and progress to rational counting. I believe this will lay a good foundation when my learners start to do computation*." T2F indicated, "*In my Grade 2 class, I spend more time on getting my learners to understand place value and computational skills apart from teaching them the normal counting and number value. Getting a good understanding of early numbers and their values will assist in problem solving activities."* According to the Grade 3 teacher, she stated, "*In my class, I follow the CAPS curriculum very closely and teach every aspect – counting, computations skills; place value, properties of number and a host of other aspects as outlined in the CAPS curriculum. These are all important concepts that young children must understand and have deep knowledge*."

Both the H1F and SA1F also shared similar views of teachers on the importance of early number sense in the foundation phase. They too agreed that learners would continuously be challenged with understanding mathematics without appropriate number sense during their early schooling. According to H1F, she stated, "*I have found many learners leaving the foundation phase without a strong understanding of number sense and basic computational skills. This creates many problems for both teachers and learners in the intermediate phase.*" SA1F shared her experience of learners understanding of number sense in the entire district. She stated

> *Number sense is the basis of all mathematical understanding. In my district and the schools that I visit, most learners struggle with number sense. This is evident in the national and international results. We must make sure that our learners understand number sense before they exit the foundation phase. As a subject advisor, I stress the importance to teachers to emphasise early number sense before moving into the next topic. The CAPS curriculum is explicit on weighing number sense in each grade, therefore teachers need to spend enough time teaching this topic.*

From the findings and the participants' voices, there is evidence that all participants recognise and acknowledge the importance of early number sense in the foundation phase. They all agreed that without a sound foundational knowledge and understanding of the various conceptual and procedural knowledge of number sense, learners would often experience challenges in later grades. This is evidence of South African learners results in the national and international, where most learners experienced challenges with basic number sense.

There has been sufficient research done that focused on the mathematical performance of learners; however, less research has dealt with teachers' knowledge and understanding of number sense and its importance in the early grades. To effectively teach number sense in the early grades, teachers must have a sound knowledge of the content and pedagogy of number sense. The researcher asked the participants to explain their understanding of number sense and how they approached the teaching of number sense in the early grades. The responses varied from teachers to the HoD and the subject advisor
to this question.

All participants T1F, T2F, T3F, H1F and SA1F agreed that number sense is an important focus area in the Curriculum and Assessment Policy Statement. To substantiate the importance of early number sense, participants stated that,

> *Without a sound knowledge of basic number sense in the early grades, children will struggle with mathematics concepts in later grades. We understand that every child must have good number sense before they exit the foundation phase, and it is mandatory in the CAPS policy document. As teachers, HoD and subject advisor, we have to monitor content coverage and the amount of time spent in teaching number sense in the early grades.*

Added to the understanding of number sense, the grade 1 teacher T1F stated, "*For Grade 1, CAPS has emphasised the importance of number sense. It is given the most weighting (65%) in comparison to Grades 2 (60%) and 58% in Grade 3. I believe that since young children are beginning to understand basic mathematical concepts, this is why Grade 1s have a high weighting. I place much emphasis on understanding of numbers, number names, number values and identification of numbers in Grade 1.*

Both T2F and T3F stated that they approach their daily lessons with counting activities. Children are expected to counting forwards, backwards, skip counting, counting in multiples. They then begin with basic mental calculations and thereafter learners are given problem solving sums to do. All of this begins prior to the actual lesson for the day.

From the response, it is evident that teachers are aware of the importance of number sense in the early grades and their focus is on ensuring that learners have a sound understanding of basic number sense. From the evidence in the learners books and the teachers planning file, the researcher noted the different kinds of activities and strategies teachers have adopted to improve early number sense. The researcher also noted that learners were fully engaging with the DBE's Rainbow workbooks and the Gauteng learners workbooks. In teachers planning files there were evidence that the CAPS policy document was being followed very carefully and that teachers had a 'content coverage checklist' for each term.

To delve into teachers' understanding of number sense, the researcher probed further and asked teachers, the HoD and subject advisor if they had any qualifications in mathematics. He also asked if they knew what content was expected to be taught in each grade.

Regarding their qualifications in mathematics T1F, T2F and T3F stated that they did not have a 'pure mathematics qualification.' All three teachers stated that,

> *They completed a three year Diploma in Foundation Phase teaching during the apartheid era in South Africa. The quality of training they received cannot compare with the current university qualifications. Mathematics was a module in each year during their studies. Their highest qualification in mathematics was done in grade 9. At the teacher's college the focus of the mathematics curriculum was mainly on the 'how to teach' rather than understanding the content of mathematics.*

According to T2F and T3F they stated that most of the content knowledge of mathematics teaching was gained through their own reading, research and workshops organised by the department of education. They agreed that there should be some advance programmes for foundation phase teachers to participate in where the focus is specifically on content knowledge.

Both the HoD and the subject advisors indicated that they were not qualified as mathematics specialist for the foundation phase. They have taught mathematics in the Intermediate Phase (Grades 4-6). The knowledge about the Foundation Phase was gained through years of experience and through participation in workshops and departmental training. Both the HoD and subject advisor do not have a qualification in the Foundation Phase. According to the subject advisor, she stated, "*I applied for the Foundation Phase post in the district office, and I was surprised to have been appointed. I was informed that my appointment was due to the teaching experience I had in the Foundation Phase and my knowledge of mathematics.*"

The findings revealed above indicate that the support structure whom teachers depend on for growth, knowledge and development are not appropriately qualified for the phase. Although they may have some knowledge of mathematics, this knowledge is not phase appropriate. All the teachers, T1F, T2F and T3F agreed that the incorrect appointment of senior staff in leadership and support positions can seriously compromise the effective teaching and learning of mathematics in the foundation phase.

All participants T1F; T2F, T3F,H1F and SA1F were able to clearly articulate the content that has to be taught in each grade. They also indicated that the number range progresses from grade to grade for example, in grade 1, the number range is 50; grade 2 is 200 and grade 3 is 1000. There was evidence that teachers were using the CAPS document and were following the content guidelines carefully. All participants were able to highlight the eight teaching focus areas of number sense in the early grades, namely: Number concept development: count with whole numbers; Number concept development: represent with whole numbers; Number concept development: Describe, compare and order whole numbers; Number concept development: place value; Solve problems in context: problem-solving techniques; Addition and subtraction; Repeated addition leading to multiplication; Grouping and sharing leading to division; Sharing leading to fraction; Money and Context-free calculations.

Despite participants' knowledge of the content that has to be taught in early number sense, when the researcher asked the participant their understanding of how to teach each content, teachers' facial expressions and body language changed immediately.

T3F stated,

> "*I may know all the different aspects to teach, my biggest challenge is how to teach the content. My training at the Bantu teacher's training college of education did not equip me with the appropriate knowledge and skills to teach most of these concepts. I teach the way I was taught*."

T1F response to this question,

> *I try to follow the Gauteng workbooks and the DBE Rainbow workbooks on how to teach sections such as decomposition and breaking down. This is the biggest challenge in my class. To make matters worse, I do not have the necessary resources in my class. I must admit I am struggling with breaking down methods for subtraction. The addition is easy, but subtraction is giving me many problems.*

T1F shared her view,

> *In my grade 1 class, I don't know how to teach children with language barriers. I find it very difficult to teach my learners place values, number names, and numerical values. The CAPS curriculum does not provide ample time for me to spend teaching and consolidating these sections. Furthermore, we were trained during the apartheid years in inferior colleges and now we are teaching in the township and urban schools. Children are experiencing a significant problem with language and comprehensibility.*

According to the HoD, she stated

> *We are forced to adapt the curriculum content, which is a big problem for me. I do not understand curriculum adaptation and accommodation as stipulated in White Paper 6 on Inclusive Education. For me, the biggest problem is teaching problem-solving mathematics, and I find there is a big difference between 'word sums' and 'problem-solving sum.*

Although all the participants have some knowledge and understanding of number sense in the foundation phase, teachers are experiencing challenges with the 'how to teach the content.' They may understand the importance of number sense; if teachers are not supported with a profound understanding of the pedagogy, they would either teach the way they were taught or will not teach specific topics.

Teachers' Views of Support Received from HoD and Subject Advisor

Continuous professional development is an integral part of ongoing teacher development. Several studies have highlighted the importance of continued professional development in mathematics. In this study, the researcher wanted to elicit teachers' views on the support they received to assist them in teaching number sense in the early grades.

All three teachers, T1F, T2F and T3F, indicated that they had received some support in the Foundation Phase. However, the support they received was very brief and short, focusing mainly on generic issues regarding mathematics teaching. They all stated that they met with the HoD at the beginning of each term and the discussion was usually based on content coverage for the term, assessments and supporting learners who experience challenges in mathematics.

In her response to support regarding number sense, T1F stated,

> "*As a grade 1 teacher, I would like my HoD to support me in how to teach certain concepts about number sense. This is not forthcoming from her. I have requested my HoD to help us with teaching for example, 'place value' through gaming in Grade 1. Most of the time, she would say that she would come back to us, but she does not.*" According to T3F, she stated: "*I have received very little support from my HoD regarding the teaching of calculations in my Grade 3 class. I have requested help regarding calculation strategies. My HoD referred me to some websites and YouTube videos. What I was looking for is a training working using different calculation strategies*."

T2F was the only teacher who indicated that she had received support from the HoD regarding the teaching of number sense. She said,

> "*Whenever I am struggling to teach a concept on number sense, I can go to my HoD and she is very helpful. I always show me how she has taught the concept for example 'decomposition strategy. This is one-on-one support that I received.*"

From the discussion above, it is evident that the level of support teachers receive at the school level seems to vary from person to person. Both T1F and T3F indicated that they do not receive the desired support from their HoD compared to T2F.

When the HoD was asked how she supports the teachers, she stated,

> "*I often meet and discuss mathematical issues every term with my teachers. Regarding specific mathematics teaching and learning, I often support teachers one-on-one, and I address specific problems with each teacher. When I don't know how to explain a certain content area, I always call the subject advisor and ask for her advice.*"

The HoD also stated that she often attends all mathematics workshops organised by the district or the provincial offices. She often shares this information with her teachers on her return to school on her return to school.

> "*I make sure that I share whatever information I get from the workshops at the province with my teachers. In this way, my teachers are aware of the expectations from the department of education*."

According to teachers, although there is sharing of information with them from meetings, the needs of teachers are specific. According to the CAPS document, various strategies are provided to teachers to teach number sense. They need to understand how to use these classroom strategies, such as the use of base 10; geoboards; gaming in mathematics, dot cards, manipulatives, decomposition, subtising, number lines, and number facts. T1F said,

> "*I have heard of subtising, but I don't know how to teach this concept in my grade 1 class. I would prefer a workshop on subtising.*" T2F said, " *I have challenges to adapt the curriculum, yet White Paper 6 – Inclusive Education Policy, clearly states we must adapt our teaching and learning – I need support on how to adapt some of the topics and subtopics in number sense in my grade 2 class*."

Regarding the support from the Subject advisor, all the participants agreed that the subject advisor usually invites all teachers to their districts once or twice a year. They conduct workshops on number sense or other specific topics in mathematics. At these workshops, advisors try to train teachers on concepts for one or two hours. In most training, subject advisors often 'speed' through the content, and there is very little participation or engagement with the teachers. T1F said,

> "*The last training I attended on using number lines in mathematics, I did not get an opportunity of asking any questions. The handouts were given, the subject advisor presented the lesson, indicated to us to read certain sections of the handouts and referred us to the Power-Point presentation."* T2F also had a similar experience. She stated that at the workshop on "*Number sense – developing by building number relationships", the subject advisor also raced through the presentation; however, she gave us some excellent strategies such as number medley, five frames, using fingers, and making a two-more than and two-less than sets. These were helpful strategies, but we needed a deeper understanding of implementing them in the classroom*."

From the participants' views above, it is evident that participants are not receiving the desired support they require to teach number sense in the early grades.

Discussion

This study aimed to explore how teachers were supported to teach number sense in the early grades with a small sample of teachers, HoD and subject advisor in a district in Gauteng Province. The study also delved into teachers understanding of number sense and how they approach the teaching of number sense.

The findings revealed that all teachers had a good understanding of the concept of number sense. Their understanding aligns with Van de Walle et al. (2015), who state that number sense includes a person's ability to use and understand numbers by knowing their relative values and names. This view also concurs with explaining number sense in the CAPS policy (DBE, 2011), which states that number sense is more than just identifying and naming numbers. It is about gaining an in-depth knowledge of how numbers work together into a meaningful whole. The DBE further states that a sound understanding of number sense facilitates problem-solving, reasoning, and discussion around mathematical ideas.

Despite all participants having a good understanding of the content of the CAPS policy and the aspects that have to be taught under the topic Numbers Operations and Relationships, all participants indicated that they lacked the "how-to" part of teaching the concepts. There was evidence that teachers lacked knowledge and understanding of how to teach decomposition of numbers, how to introduce place value, number lines for computations, problem-solving, subitising and using games in mathematics.

According to Pittalis, Pitta-Pantazi and Christou (2015), all teachers should have a good understanding of how to teach the various aspects or subtopics of number sense. McLellan (2012) agrees and acknowledges that a sound knowledge and experience of number sense is fundamental for later mathematical abilities and competencies. From the evidence in this study, foundation phase teachers are challenged with teaching number sense concepts. This could be evidence of the low performance in mathematics in the national and international assessments. Haylock (2010) believes that effective learning of mathematics depends on a good understanding of early number sense ; therefore, it requires teachers who understand the curriculum and can explain the content and concepts at an age-appropriate level. The findings revealed in this study concur with the theoretical framework of this study CBMoTD, whereby teachers are concerned about their levels, knowledge and understanding of how to teach number sense in the foundation phase. This raises a significant issue for ongoing professional teacher development.

Regarding participants' views on the support they received to enhance their knowledge and understanding of the teaching of number sense, there is evidence that this support was not to their advantage. Although the HoD and subject advisor for mathematics offered some support to teachers, it is evident that teachers needed more than just a one or two-hour training session on basic concepts of number sense. According to Briand-Newman et al. (2012), professional development for teachers need to provide both theoretical knowledge and practical implementation of that knowledge in the classroom. On-going professional teacher development must focus on content knowledge and pedagogical content knowledge and that teachers should be supported from within the school (HoD) and external support (subject advisor and other relevant stakeholders) (DBE, 2006). Bray (2011) agrees that professional teacher development should focus on content-specific issues; in this study, the focus should be on the teaching of number sense, for example, the theory and practice of decomposition; insight into place value; subitising and the theory of number sense. Hill et al., cited in Briand-Newman et al. (2012), state that teachers knowledge of mathematics should contain both general and content-specific knowledge. Common content knowledge should include the use of correct mathematical terms and notations and be able to recognise when learners give incorrect answers. According to Aunio et al. (2016), if teachers are confident to use and teach various mathematics topics, there will be a significant improvement in learners understanding of mathematical concepts. Teachers' confidence level in mathematics directly depends on the kinds of support they receive to teach mathematics and their qualifications. Brian-Newman et al. (2012) have found agreement amongst teachers and other mathematics stakeholders that teachers need ongoing professional development to refine and revise their understanding of mathematics content to meet the many demands of teaching. For this reason, ongoing professional development for foundation phase mathematics teachers should focus both on the theoretical and practical application of mathematics in a classroom context. The Education Alliance (2006) agrees that if teachers do not have the appropriate content knowledge and if they lack understanding of mathematical concepts, there is a dire urgency to upgrade teachers pedagogical content knowledge.

Conclusion

In the Foundation Phase, the profound understanding of early number sense has been recognised as a fundamental section of mathematics. Every child needs to have a good understanding of number sense before leaving the Foundation Phase (DBE, 2011) to avoid any challenges or barriers in mathematics learning at a later stage in their

schooling. Several studies have confirmed the importance of early number sense and its association with later mathematical achievement. For these reasons, teachers' pedagogical content knowledge has been widely acknowledged as a significant factor for improving learners' knowledge, understanding and achievement in mathematics. Teachers need ongoing professional development rather than once-off training to ensure that they are kept abreast of the latest approaches to teaching specific content in an early number sense.

Recommendations

The author recommends the following strategies to improve support to foundation phase teachers. Teachers should participate in a further mathematics course that focuses on number sense and the strategy to strengthen the teaching of number sense content. Through continuous professional development, teachers should be capacitated to integrate number sense into mathematics teaching. The Department of Basic Education should collaborate and partner with the higher education institutions to develop an intensive training programme on early number sense and various approaches to teaching specific content. These in-service training programmes should be tailored to particular topics and contents outlined in the CAPS document. Another recommendation is to establish network learning communities where teachers can communicate with foundation phase teachers globally to share good practices. It is also recommended that teachers should be allowed to video record their teaching and critically examine and reflect on their practices – they could learn from their teaching and improve their strategies for future lessons. Teachers should also become involved in 'lesson study' an approach that has been very successful in Japan (Huang & Shimizu, 2016).

Recommendation for Further Research

Since this study was limited to one school in one district in the province, it is recommended that further studies of a similar nature be carried out with a larger sample of teachers in all districts in the province. The authors envisage findings dissimilar due to the professional qualification of heads of department and curriculum subject advisors.

Limitations of Study

The research was limited to a tiny sample in a single school in one district in the Gauteng Province in South Africa. The author believes that the findings may be similar in other districts since the national and international assessments have revealed poor mathematics results among South African learners.

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Appendix 1.

Semi-structured Interview Schedule

Questions to Teachers and Foundation Phase Department Head

- Have you been trained to teach mathematics in the Foundation Phase?
- What is your highest qualifications in mathematics?
- Briefly explain your understanding of number sense.
- Explain your view of teaching number sense in the early grades.
- Describe the kinds of curriculum training you received from the Department of Education regarding mathematics in the Foundation Phase.
- Did you receive training and development specifically to teach number sense in the early grades?
- Explain the support you received from your head of department.
- Explain the support you received from the FP subject advisor regarding teaching of number sense?
- Describe kind of support do you require to strengthen your ability to teaching number sense in the early grades.
- How often do you attend workshops and training to teaching mathematics (number sense) in the Foundation Phase?

Department Head

- Have you been trained to teach mathematics in the Foundation Phase?
- Describe the kinds of curriculum training you received from the Department of Education regarding mathematics in the Foundation Phase.
- Did you receive training and development to teach number sense in the early grades?
- Explain the support you received from your head of department.
- Explain the support you received from the FP subject advisor regarding teaching of number sense?
- Describe kind of support do you require to strengthen your ability to teaching number sense in the early grades.
- How often do you organise workshops for the teachers in the Foundation Phase?

Curriculum Subject Advisor

- Have you been trained to teach mathematics in the Foundation Phase?
- Describe the kinds of curriculum training you received from the Department of Education regarding mathematics in the Foundation Phase.
- How long have you been a curriculum subject advisor?
- Did you receive training and development to support the teaching of mathematics in the early grades

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Research Article

Preschool teacher's beliefs about creativity and children creativeness

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Abstract

The aim of this study was to determine what beliefs preschool teachers hold about creativity in general and about children's creativeness. A total of 366 preschool teachers and preschool teaching assistants participated in the survey, by completing a questionnaire designed for the purposes of this study in Slovenia. The results show that participants predominantly believe that creativity is innate, that it is a characteristic of all people, and it can be developed, in some specific areas, such as the arts. Participants also believe that all children are creative, but not at the same level and not in all areas. They agree that children need motivation to express and develop their creativity, which indicates an awareness of the importance of encouraging creativity. An analysis of the different views on creativity among teachers and teaching assistants shows differences in perception of children's creativeness It follows that the longer training of preschool teachers can provide not only more knowledge and a sense of competence in working with children, but also the possibility of an over-structured, curriculum-constrained and pre-determined framework of seeing the child. This is why the results of the survey - an insight into the perspectives of preschool teachers and preschool teaching assistants - represent an important contribution in the area of developing the creativity of preschool children. The survey results reflect on how to guide the work of preschool teachers in the direction of developing and supporting the creativity of preschool children, pointing to the fact that (i) preschool teachers must be trained how to identify, foster and facilitate children's creativity and (ii) they should acquire these competences during initial teacher training programmes and nurture them through continuous professional development programmes.

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Introduction

Teachers and schools have always been the reflection of societies, their priorities and their needs. Today, in a fast-changing world, teachers' roles are changing, as are the expectations directed towards them. Teachers are faced with various demands (European Trade Union Committee for Education - ETUCE, 2008) such as in-depth subject knowledge, advanced pedagogical skills, reflective practice and the ability to adapt their teaching to the needs of each individual as well as to the needs of a group of learners. Furthermore, teachers need to help students acquire not only 'the skills that are easiest to teach and easiest to test', also known as 'hard skills' (Michnick Golinkoff and Hirsh-Pasek, 2016), but more importantly, 'soft skills' (ibid, 2016), as ways of thinking (creativity, critical thinking, problem-solving, decision-making and persisting, self-regulated learning, etc.); ways of working (communication and collaboration); tools for working (including information and communications technologies); and skills pertaining to citizenship, life and career as well as personal and social responsibility for success in modern democracies (OECD, 2011). Michnick Golinkoff and Hirsh-Pasek (2016) claim that in order to re-define success in the 21st century the six Cs need to be developed: (i) collaboration, (ii) communication, (iii) content, (iv) critical thinking, (v) creative innovation, and (vi) confidence. Within this context, creative innovation or creativity is understood as 'rearranging the old to make the

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new' (Michnick Golinkoff and Hirsh-Pasek, 2016, p.187). Creativity and creative problem-solving is recognised as one of the key skills that enable talented children - and all other children - to adapt adequately to the demands of modern society. With the realisation that creativity can be learned, the key issue of supporting creativity is shifting to the early years of early childhood education (ECE). Consequently, the most important role in this process belongs to teachers, who should include in their activities instruction and elements to facilitate creativity while at the same time achieving the educational objectives set by the curriculum (Lee and Kemple, 2014).

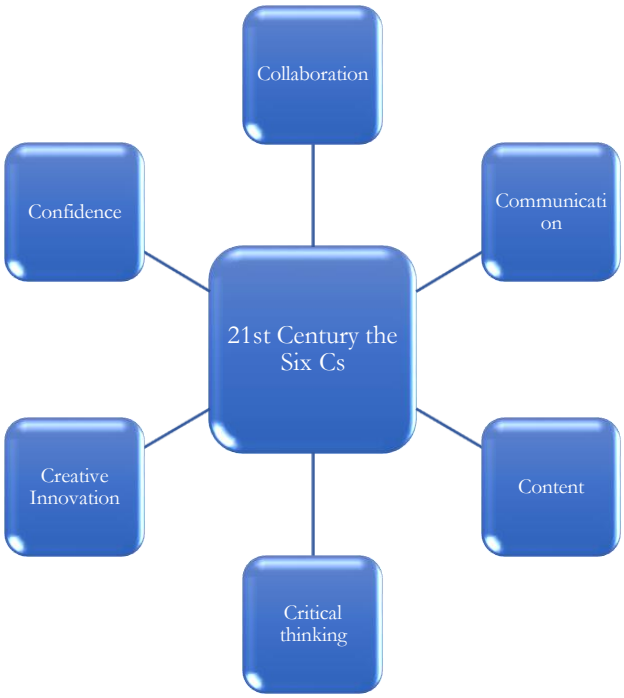

Figure 1
21st Century the Six Cs

Since it has been proven (Janssen et al. 2013; Rentzou and Sakellariou, 2011) that attitude is essential in constructing the mindset to adapt new requirements and perform new activities and roles (Drljić and Kiswarday, 2016), understanding the practices and beliefs of preschool teachers regarding creativity is, in effect, a critical starting point in the creation of an educational environment that encourages creative thinking (Cheung and Leung 2013; Lee and Kemple, 2014).

Aim of the Study and Conceptual Framework

As the study aims to determine preschool teachers' beliefs about creativity in general and about children's creativeness, it is important to comprehend that in the Slovenian school system preschool education is carried out by preschool teachers and preschool teaching assistants. Both, preschool teachers and their assistants need to be properly qualified. Preschool teachers are obliged to hold a bachelor's degree in preschool education. Bachelor preschool education study programmes are provided by faculties of education. They take three years to complete and encompass 180 European Credit Transer and Accumulation System credits (ECTS). For preschool teaching assistants, it is necessary to have at least a secondary professional education. These programmes are delivered at specialised secondary schools. In addition, both preschool teachers and preschool teaching assistants have to pass a professional exam, which consists of three elements: Slovenian language (and/or the language of a relevant ethnic minority), educational legislation and knowledge of the Slovenian Constitution (The Education System in the Republic of Slovenia, 2019). We also emphasise (Rutar, 2021) that Slovenia is one of the few European countries that integrate care, protection and education in a comprehensive way, ensuring a unified organisation and financing of preschool education for children in the first (0-3 years) and second (4-6 years)age groups. This is expressed both in the training of preschool teachers, who are trained to work with children in the first and second age groups, and in the Kindergarten Curriculum (1999), which sets out the objectives and activities for working with children in both age groups. The Organisation for Economic Co-operation and Development (OECD) also argues that care/protection and education concepts are interlinked in quality kindergartens (OECD, 2001).

In order to better nurture and foster children's creativity, Swainston and Jeanneret (2013) suggest that conducting research on preschool teachers' beliefs is an essential aspect of understanding creative pedagogical ECE practices, as well as informing the design of up-to-date initial teacher education programmes and continuous professional

development programmes. Since beliefs are the main determinants of behaviour, it is crucial to comprehend how preschool teachers conceptualise creativity (Ariffin and Baki, 2014; Cheung and Leung, 2013; Lee and Kemple, 2014; Leggett, 2017). Fryer and Collings (1991) found that most teachers define creativity as imagination, originality and self-expression. In addition, studies (Eckhoff 2011; Leggett 2017) have shown that ECE teachers define creativity as originality. Researchers have also found that teachers' understanding of creativity is also determined by their effort (Bloomquist, 2010), affection (Cropley, 2001) and sense of responsibility for fostering creativity (Aljughaiman and Mowrer-Reynolds, 2005). Similarly, the teacher's role in fostering children's creativity is also important, but most research on creativity in education focuses on creativity in school, but not in preschool. Perhaps the lack of interest in research on creativity in preschool can be attributed to a divided opinion on whether preschool children can be creative at all. Many (e.g., Sorokin, 1987; Rosenblatt and Winner, 1988; Ayman-Nolley, 1992; Cropley, 2001) do not attribute creativity to preschool children, arguing that (i) children have a variety of ideas that are new to them but are not useful, and (ii) children lack criticality. However, some research by Castro-Fajardo, Santamaria, Bernal-Hernandez, Gomez-Hernandez, Garcia-Cepero (2014) demonstrated that 45% of the educators agree that childhood is the 'golden age' of creativity.

The concept of creativity, defined above, also points to some of the misconception that teachers and educators have about creativity. A survey *Creativity in Schools in Europe* (2009) found that most teachers believe that creativity can be related to different areas of life and that anyone can be creative. They also agree that creativity needs to be developed at school, but they are not sure how to do it. Cypriot teachers also agree that creativity is a general characteristic of all individuals (Diakidoy and Phitiaka, 2002), on the other hand, Fryer and Collings (1991) found that most British teachers believe that creativity occurs in a few individuals. In some studies, many teachers associated creativity solely with children's artwork (Diakidoy and Kanari, 1999). On the other hand, some studies determined that ECE teachers consider creativity from a much broader perspective, and as a result, associate it with other aspects of learning and instruction (e.g., role-play, reading, writing, science, and drama) (Eckhoff, 2011; Yates and Twigg, 2017).

Therefore, research indicates that teachers' beliefs about creativity, about the factors affecting creativity, and the ways of supporting creativity in ECE settings differ to a great extent.

Research indicates that the concept of creativity is often wrongly defined by teachers. Based on this, we can also identify so-called myths or misconceptions about creativity (Robinson, 2017). According to Robinson (2017), there are three myths that are most commonly found in misunderstandings about creativity, creative action and the characteristics of creative individuals. The first myth relates to the misconception that creativity is only for 'specific individuals', where creativity is consequently defined as an unchanging and unattainable ability of a small group of specific individuals. In the second myth, Robinson (2017) says that creativity is 'reserved' for specific areas of individual activity, such as the arts. The third myth describes misconceptions about creative individuals (Robinson, 2017), who are supposedly imagined as socially maladjusted, self-centred and weird. Similarly, both Turkish (Oral and Guncer, 1995, in Cropley 2001, p. 137) and American (Westby and Dawson, 1995, in Cropley, 2001, p. 137) researchers report that creative pupils are described by their teachers as not so close to their heart, and as disobedient, undisciplined, defiant and aggressive. Contrary to these myths, creative potential is a characteristic of every individual in any field of activity, and its development requires education, skill, imagination and discipline (Michnick Golinkoff and Hirsh-Pasek, 2016, 191). Consequently, preschool teachers should continuously reflect on their own beliefs about creativity and children's creativeness in order to facilitate and foster a supportive ECE learning environment.

Research Problem

According to the analysis of the presented research, we conclude that a teachers' attitudes are a key factor in his/her work in terms of developing and supporting the creativity of preschool children. Kampylis et al. (2009) find that fostering children's creativity is an important part of the teacher's role in the classroom. In addition, Diakidoy and Kanari (1999: 226) highlight as two fundamental aspects of fostering creativity in education the need to (1) find out what attitudes and beliefs teachers have about creativity and (2) on that basis, consider how to train teachers to identify and foster creativity in the preschool period in general. Building upon this research theme, the current study intends to gain a more comprehensive understanding of preschool teachers' beliefs regarding creativity, as well as their understanding of children's creativeness.

Specifically, the study was based on the quantitative paradigm of research and it aimed at identifying:

- Preschool teachers' beliefs about creativity in general
- Preschool teachers' beliefs about children's creativity

Additionally, we wanted to determine the possible differences in beliefs regarding preschool teachers' work position, referring to their position as a preschool teacher or a preschool teaching assistant.

Method

Research Design

The research followed the quantitative approach (Creswell, 2014) using descriptive and a causal non-experimental survey research design, which was found to be the most suitable as the research aimed to describe the present situation as it exists (Cohen, Manion, and Morrison, 2007). With this research, a descriptive and causal non-experimental design was used to determine preschool teachers' beliefs about creativity in general and about children's creativeness and the differences in these beliefs, according to their work position.

Participants

In total, 366 preschool teachers and preschool teaching assistants employed in Slovenian public kindergartens were included in our study, which accounts for the 3.7 % of the total population of preschool teachers and their assistants in Slovenian kindergartens. Among participating teachers and teaching assistants, 358 (97.8%) were female and four (1.1%) were male, while four (1.1%) did not declare their gender. On average, the participants had 17 to 15 years' working experience (M=17, 15, SD=11, 65, range 0-38). The participants were selected randomly from all regions in Slovenia.

Data Collection

We collected the data using a questionnaire with five sections, and for the purpose of this paper we will use the questions from the first section (demographic data) and the questions from the second section, which consists of a 5-point Likert scale of attitudes with answers (1 - I do not agree at all, 2 - I do not agree, 3 - I cannot decide, 4 - I agree, 5 - I fully agree). The statements in this section refer to (1) teachers' beliefs about creativity in general and (2) teachers' beliefs about creativity in relation to children. The set of statements on beliefs about creativity includes five statements and the set on creativity in relation to children includes seven statements. Both sets of scales show high internal consistency ($\alpha gen = 0.860$, $\alpha chi = 0.901$). The questionnaire was developed for the purposes of this research by the authors of the paper (See Appendix 1)

Data Analysis

The data were processed using SPSS and the following statistical procedures were used: frequency distribution (f, f %); inferential non-parametric statistics (Mann-Whitney test). Mann-Whitey tests were used to test differences in beliefs about creativity in general and about children's creativeness and differences in these beliefs according to their work position. The results obtained are presented in tables. All decisions were made up at ≤ 0.05.

Results

Preschool Teachers' Beliefs Regarding Creativity in General

Table 1

Frequency (f) and Percentage (f %) for Each Level of Agreement with the Statements Made About Creativity in General

	Frequency	Percent
Creativity is innate.		
I fully agree.	21	6.2
I agree.	153	44.9
I cannot decide.	48	14.1
I do not agree.	92	27.0
I do not agree at all.	27	7.9
Creativity is a characteristic of all people.		
I fully agree.	17	5.0
I agree.	120	35.1
I cannot decide.	48	14.0
I do not agree.	135	39.5
I do not agree at all.	22	6.4
Only some individuals are creative.		
I fully agree.	11	3.2
I agree.	92	27.1

I cannot decide.	38	11.2
I do not agree.	164	48.4
I do not agree at all.	34	10.0
Creativity cannot be developed.		
I fully agree.	5	1.5
I agree.	11	3.2
I cannot decide.	15	4.4
I do not agree.	227	66.6
I do not agree at all.	83	24.3
People with an arts tendency are more creative.		
I fully agree.	54	16.0
I agree.	137	40.5
I cannot decide.	46	13.6
I do not agree.	84	24.9
I do not agree at all.	17	15.0

As can be seen from the table above, the majority of the teachers surveyed agree (44.9%) or strongly agree (6.2%) with the statement that creativity is innate. It is interesting to compare the level of (dis)agreement with the claims that creativity is a characteristic of all people and that only some individuals are creative. On the one hand, a majority of teachers (45.9%) do not think that all people are creative, while on the other hand, a majority (58.4%) also disagree that only some people are creative. Furthermore, teachers do not agree at all (90.9%) with the statement that creativity cannot be developed.

Preschool Teachers' Beliefs Regarding Children's Creativeness

Table 2

Frequency (f) and Percentage (f %) for Each Level of Agreement With the Statements on Children's Creativeness

	Frequency	**Percent**
All children are creative.		
I fully agree.	63	28.6
I agree.	154	45.8
I cannot decide.	25	7.4
I do not agree.	53	15.8
I do not agree at all.	8	2.4
Some children are uncreative.		
I fully agree.	2	0.6
I agree.	58	17.2
I cannot decide.	48	14.2
I do not agree.	201	59.5
I do not agree at all.	29	8.6
Some children are more creative than others.		
I fully agree.	142	42.0
I agree.	168	49.7
I cannot decide.	7	2.1
I do not agree.	16	4.7
I do not agree at all.	5	1.5
A child may be creative in one area but not in another.		
I fully agree.	53	15.6
I agree.	124	36.5
I cannot decide.	24	7.1
I do not agree.	107	31.5
I do not agree at all.	32	9.4
Creative children do not need additional motivation to be creative.		
I fully agree.	6	1.9
I agree.	61	19.1

I cannot decide.	34	10.7
I do not agree.	196	61.4
I do not agree at all.	22	6.9
Creativity cannot be fostered in every child.		
I fully agree.	1	0.3
I agree	54	15.9
I cannot decide.	27	8.0
I do not agree.	211	62.2
I do not agree at all.	46	13.6
Creative children are often difficult and undisciplined.		
I fully agree.	8	2.4
I agree.	24	7.1
I cannot decide.	43	12.7
I do not agree.	206	60.9
I do not agree at all.	57	16.9

Regarding views on children's creativity, we find that teachers are more inclined to believe that all children are creative than to believe that all people are creative; 28.6% fully agree and 45.8% agree. This opinion is confirmed by the majority disagreement with the statement that some children are uncreative (59.5% disagree, 8.6% strongly disagree). At the same time, there is a strong (91.7% agreement) belief that some children are more creative than others. The statement that a child can be creative in one area but not in another is not a dominant view, as participants' opinions are evenly spread. However, the predominant views of teachers on fostering creativity are positive. Teachers mostly (68.3%) do not agree that creative children do not need additional motivation, and they mostly (75.8%) do not agree that creativity cannot be fostered in every child. In addition, teachers mostly do not agree (77.8%) that creative children are often difficult and undisciplined.

Differences in Preschool Teachers' Beliefs About Creativity in General According to Work Position

Table 3

Differences in Preschool Teachers' Beliefs About Creativity in General According to Work Position

Claim	Work position	N	$\bar{R}$	U	2P
Creativity is innate	Preschool teacher	252	188.42	12368.500	**0.048***
	Preschool teaching assistant	111	167.43		
Creativity is a characteristic of all people	Preschool teacher	240	162.25	100019.500	**0.007***
	Preschool teaching assistant	101	191.80		
Only some individuals are creative	Preschool teacher	241	168.31	11401.000	0.329
	Preschool teaching assistant	101	179.12		
Creativity cannot be developed	Preschool teacher	237	162.59	10332.000	**0.037***
	Preschool teaching assistant	101	185.70		
People with an artistic tendency are more creative	Preschool teacher	240	173.87	10952.000	0.224
	Preschool teaching assistant	99	160.63		

The results of the Mann-Whitney tests (U = 12368.500, 2P = 0.048 and U = 100019.500, 2P = 0.007) show that there are statistically significant differences between teachers and teaching assistants in their agreement with the claims 'Creativity is innate' and 'Creativity is a characteristic of all people'. Teachers are more inclined than teaching assistants to agree that creativity is innate ($\bar{R}$= 188.42), and teaching assistants are more inclined than teachers to agree that creativity is a characteristic of all people ($\bar{R}$= 191.80). A statistically significant difference between teachers and teaching assistants is also found in the agreement with the claim that creativity cannot be developed (U=10332.000, 2P=0.037), which is also more strongly agreed by teaching assistants ($\bar{R}$= 185.70).

Differences in Preschool Teachers' Beliefs About Children's Creativeness According to Work Position

Table 4

Differences in Beliefs About Children's Creativeness According to Work Position

Claim	Work position	n	$\bar{R}$	U	2P
All children are creative	Preschool teacher	240	174.14	11366.000	0.275
	Preschool teaching assistant	101	163.53		
Some children are uncreative	Preschool teacher	237	166.23	11193.000	0.375
	Preschool teaching assistant	100	175.57		
Some children are more creative than others	Preschool teacher	237	164.24	10721.500	0.184
	Preschool teaching assistant	99	178.70		
A child may be creative in one area but not in another	Preschool teacher	237	169.79	11900.000	0.926
	Preschool teaching assistant	101	168.82		
Creative children do not need additional motivation to be creative	Preschool teacher	229	160.78	10126.000	0.773
	Preschool teaching assistant	90	158.01		
Creativity cannot be fostered in every child	Preschool teacher	239	171.90	11735.000	0.645
	Preschool teaching assistant	101	167.19		
Creative children are often difficult, undisciplined	Preschool teacher	238	172.86	11101.000	0.270
	Preschool teaching assistant	100	161.51		

When examining the role of the workplace for the set of claims on children's creativity, there were no statistically significant differences in agreement with these claims between teachers and teaching assistants, indicating that the two groups of participants were fairly similar in their views.

Discussion and Conclusion

According to the older researchers in the field of creativity (Milgram 1990; Gardner, 1996; Srića, 1999; Marentič Požarnik, 2000), creativity is a general human characteristic. The analysis of the results of the present study shows that the participants' believe that creativity is innate, that it is a characteristic of all human beings, and that it can be developed, but mainly in specific areas of individual activity (e.g., the artistic field). These results show the duality and ambivalence of professionals' beliefs about creativity. On the one hand, the belief that creativity is innate may preclude participants' awareness of the possibilities of influencing the development of creativity, while on the other hand they report that their actions can change and develop individual creativity. As can be seen in our review of recent studies (Fryer and Collings, 1991; Diakidoy and Phitiaka, 2002; the European Commission, 2009; Ariffin and Baki, 2014; Cheung and Leung, 2013; Lee and Kemple, 2014; Leggett, 2017), teachers' understanding of creativity is an important element of their educational practice. However, the results of the present study show that teachers mostly believe that creativity cannot be developed and that people with an artistic tendency are more creative. In this context, we can observe the presence of some misconceptions about creativity (Robinson, 2017), in particular the myth that creativity is 'reserved' for specific areas of individual activity, for example, the arts. Similarly, Marentič Požarnikova (2000, 93-94) argues that in the Slovenian school system creativity is too narrowly understood and mostly associated only with aesthetic and technical areas, while creativity in other areas is forgotten.

We further examined teachers' views on children's creativity. We found that professionals believe that all children are creative, but at different levels: some more, some less, indicating that they recognise differences in the level of creativity of individual children. Teachers have divided opinions on the areas in which children express their creativity - they believe that children are creative in some areas and not in others. They agree that children need motivation to express and develop their creativity. In the preschool period, a particularly important aspect of fostering creativity is the creation of a stimulating learning environment and the planning and implementation of activities and instructions through promoting creative approaches, which can be initiated by children through learning by doing, active involvement and experiential learning (Cachia, Ferrari, Ala-Mutka and Punie, 2021).

An analysis of the differences in attitudes towards creativity between teachers and teaching assistants shows that teachers believe that creativity is innate but can be developed. Teaching assistants, on the other hand, believe that creativity is a characteristic of all people, not just a specific group of individuals. These conclusions can be partly explained by the differences in the level of education between the two groups of professionals. A longer education for teachers may bring with it not only more knowledge and a sense of competence in working with children - which may explain the differences in views on developing and fostering children's creativity - but also the possibility that teachers have an over-structured, curriculum-constrained and pre-determined framework of seeing the child. Perceiving the child with predefined criteria and assumptions, such as which goals to achieve and which tasks to

master, makes it impossible to create an open, innovative and stimulating learning environment that facilitates and fosters creativity.

To sum up, educational institutions should, at all levels of education, including the preschool level, incorporate, promote and foster creativity (Council of the European Union, 2008, 2009) However, it must be highlighted that information specified in policy documents and curricula, it is not necessarily reflected in educational practice.

Curricula cannot be effective without supportive structures. Teachers must be trained on how to allow creative approaches from learners, to identify creativity and how to facilitate and foster it. Even though positive attitudes towards creativity are important factors in supporting creativity, they do not always automatically transfer to educational practice, which largely depends on teachers' teaching competences and experience. Therefore, greater input in teacher training is essential. Teacher training programmes should provide all teachers with guided development on classroom teaching practice in terms of recognising and fostering creativity, which should be realized both, through initial teacher education programmes for pre-service teachers and through continuous professional development programmes for in-service teachers. These conclusions also point to the policy makers and to the teacher training institutions, which are both responsible for the teaching programmes curricula and their delivery.

Limitations of the Study

The possible generalizations based on this study are limited as the participants belong to the Slovenian educational environment. In the future, the reasonable direction seems to be to enlarge the size and the heterogeneity of the sample and also to include preschool teachers from other countries and put the study in the international context. However, the study and its results do outline some important issues that need to be addressed in the context of equipping preschool teachers with guided training of classroom teaching practice in terms of recognising and fostering creativity.

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Appendix 1.
Preschool Teachers' Beliefs about Creativity Questionnaire

Preschool Teachers' Beliefs about Creativity Questionnaire						
1: I do not agree at all, **2**: I do not agree, **3**: I cannot decide, **4**: I agree , **5**: I fully agree						
Section 1: Preschool Teachers' Beliefs Regarding Creativity in General						
	Items	**1**	**2**	**3**	**4**	**5**
1	Creativity is innate					
2	Creativity is a characteristic of all people					
3	Only some individuals are creative					
4	Creativity cannot be developed					
5	People with an arts tendency are more creative					
Section 2: Preschool Teachers' Beliefs Regarding Children's Creativeness						
1	All children are creative	**1**	**2**	**3**	**4**	**5**
2	Some children are uncreative					
3	Some children are more creative than others					
4	A child may be creative in one area but not in another					
5	Creative children do not need additional motivation to be creative					
6	Creativity cannot be fostered in every child					
7	Creative children are often difficult and undisciplined					

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Research Article

Languages of learning and teaching in multilingual classrooms: educational use of the African languages

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Abstract

Black South African learners are registered in Model C schools to receive their education. The language of learning and teaching is English, whilst these learners' English language proficiency is limited. They come from different urban, townships and rural areas, and their home languages are indigenous languages. The study aims to investigate and describe the challenges facing black, English second-language South African learners and to meet their needs by offering suggestions as to how they could be assisted to learn and achieve according to their full potential. The study used qualitative analysis with interview as the main data gathering tool. The participants were teachers purposively selected from the suggested pilot schools. From the phenomenological analysis the data were gathered by means of a literature review, document analysis, interviews, classroom visits and observations. The study has revealed that the black South African learners in Model C schools are faced by numerous challenges owing to their limited English proficiency, and that they do not meet the requirements to pass their grades. Their inability to cope affects their self-esteem and confidence negatively. The learners do not take risks to participate actively during lessons as they tend to avoid embarrassment and being teased by their peers. The study resulted in formulating guidelines and recommendations that will help meet the challenges faced by black South African learners in Model C schools and support them.

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Introduction

In many parts of the world, including South Africa, teachers are facing new challenges due to rapidly increasing numbers of language and culturally different learners in their classrooms. The teachers are compelled to teach through a language they do not know well (Patten, & Newhart, 2018). The effect of this is that many teachers cannot cope with this situation as they lack the knowledge and skills to deal with such classroom contexts (Dampier, 2014). Without a high level of linguistic confidence in the instructional language, teachers cannot adequately develop their learners' basic communicative skills or their cognitive ability in that language (Akinsola, 2011). There remains a gap in the research on young learners' experiences in today 's multilingual and multicultural first language classrooms. It is this gap in the research that this paper aims to address (Dampier, 2014).

The issue of language in education in South Africa at the turn of the millennium remains heavily contested (Patten, & Newhart, 2018). Apartheid language in education policy infused with unequal language proficiency demands for school learners in the country was replaced in 1997 with a new policy based on non-discriminatory language use and the internationally accepted principle of mother tongue education in the context of a bilingual or multilingual framework (Coskun, 2017). It was designed to guarantee learners the best possible access to and proficiency in another language (English for many learners) alongside the language best known by learners upon entry to school (Maguire, & Delahunt, 2017). The policy has not been accompanied or followed by any significant government-initiated implementation plan (Coskun, 2017). It has, however, been met with several arguments against its implementation

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and these have found their way into publications which are now being used to deflect government's responsibility regarding implementation. Whilst government remains inactive on the matter, the discriminatory policy of the former apartheid government continues to be practised in schools (Msila, & Gumba, 2016).

Despite the worthy aims of protecting and supporting the use of previously disadvantaged languages and using language to promote both unity and diversity in the new South Africa (Dampier, 2014), close scrutiny reveals that the language policies of the new government and the concepts that support them, serve instead to symbolically remove fundamental social realities in contemporary South African society (Msila, & Gumba, 2016).

In recognising the historically diminished use and status of the indigenous languages, the state must take practical positive measures to elevate the status and advance the use of these languages (Msila, & Gumba, 2016). The national government and provincial governments may use any official languages for the purposes of government considering usage, practicality, expense, regional circumstances and the balance of the needs and preferences of the population as a whole or in the province concerned, but the national government and each provincial government must use at least two official languages (Willemse, Thompson, Vanderlinde, & Mutton, 2018).

A Multilingual Classroom: The Basic Problem

By the time children begin school, they have begun gaining confidence in their ability to communicate meaningfully in their mother tongue. They have built a foundation of knowledge and experience through observing and interacting with peers and adults in their community (Maguire, & Delahunt, 2017). The language, knowledge and experience that children bring to school form an important foundation for their learning in the classroom (Dampier, 2014). The educational problem faced by many children from ethnolinguistic communities is two-fold. In the first place, some have no access to education at all (Patten & Newhart, 2018). Those who do have access to school but do not speak the official language when they enter the education system find that their knowledge, experience and language rather than serving as a foundation for learning are treated as a disadvantage (Ramrathan, 2017). Their language skills do not serve them because their language has no place in the classroom. Instead, textbooks and teaching are in a language they neither speak nor understand.

Their learning and problem-solving experiences and their knowledge of how things work in their own culture and social setting do not serve them because the culture of the classroom, the teachers, and the textbooks is that of the dominant society (Patten & Newhart, 2018). The consequences for many children are predictable and have been described in numerous studies, as noted in the quotations that follow: *When approaching the learning of language, we must make a very clear distinction between the intuitive elements of language (understanding and speaking) and the logical elements (reading and writing). Intuitive elements and logical elements of language are learnt entirely differently* (Gilleece, 2015). This is the reason why you will find individuals who understand and speak a language but cannot read and write and vice versa (Patten & Newhart, 2018). The problem lies in the fact that formal pedagogy (as defined by the West and adopted by us) does not recognize this crucial difference (Department of Basic Education, 2016). Having said this, we are still left with the challenge of facilitating intuitive learning in a classroom (Maguire, & Delahunt, 2017). Children who struggle with any language are the ones who have no exposure to that language in their daily lives (Akinsola, 2011).

There are natural processes that occur when we learn our mother tongue or when we learn languages in a multilingual and multicultural environment (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018). How do we bring these into the classroom? Language learning must be considered complete only when understanding, speaking, reading and writing proficiency has been attained (Msila & Gumba, 2016). The progression of learning should also ideally proceed in the same order. An indigenously developed language learning program has demonstrated outstanding results in teaching English to first generation English learners in rural, township and urban areas. The process is described as intuitive, immersive, non-instructional and non-linear (Department of Basic Education, 2016). It mirrors the learning process of the mother tongue (Patten & Newhart, 2018). A learner is immersed into a structured language environment through a variety of interesting activities that are designed to stimulate intuitive learning. There is no overt teaching. The learner is led through different kinds of language experiences (Department of Basic Education, 2016). Language is learnt using the body, through music and through stories.

Theoretical Framework and Literature Review

This part covers the theoretical framework of this study. Further, the various processes and concepts relevant to this study will be discussed. Our conceptual framework defines multilingual identity formation in terms of learners' active involvement in the language learning process, using the classroom as the site for participative identity (re)negotiation. Here we take an encompassing view of multilingualism, viewing all learners engaged in the act of additional language learning in classroom contexts as multilinguals (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017), regardless of the number of additional languages or dialects in their repertoires, though they may not identify as such.

In addition, we argue that research in the area would benefit from adopting a multi-theoretical approach in the conceptualisation and investigation of multilingual identity (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018). In this paper a case is made for using the language classroom as a site where learners are offered the agency to develop a multilingual identity. For this to happen we argue that learners need sociolinguistic knowledge in order to understand and explicitly reflect on the languages and dialects in their own and others' linguistic repertoires, whether learned in school, at home or in the community (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018). We see the development of a multilingual identity as potentially important for two main reasons: (*a) if learners adopt an identity as a multilingual, they may be more likely to invest effort in the learning and maintenance of their languages, (b) with increasing mobility and greater diversity in communities and classrooms a multilingual mind set might lead to enhanced social cohesion in the school and beyond* (Department of Basic Education, 2016).

This paper reviews literature that relates to multilingualism and the correct status of indigenous African languages in South African schools. The study starts by stating what the South African constitution stipulates on the issue of languages and their status, as well as their expected functions in social life. The current status of indigenous languages is reviewed alongside that of other official languages which is English and Afrikaans. South Africa is a multilingual country and as such prior to 1994 English and Afrikaans were the only official languages (Department of Basic Education, 2016). There have been many indigenous languages spoken and understood by the majority of South Africans (Prinsloo, Rogers, & Harvey, 2018). It is interesting to note that the majority of South Africans spoke indigenous African languages and Setswana is widely spoken in North West Province which is the smallest but one of the richest provinces in South Africa (Prinsloo, Rogers, & Harvey, 2018). Indigenous languages had been used as languages of communication and as school subjects within provincial borders of this country up to 1994, when this country had its first democratic election (Gilleece, 2015).

It was after then that indigenous languages were accorded their deserving official status. Out of many indigenous languages spoken by South Africans, nine of them were elevated to the same status as English and Afrikaans, to make a total of eleven official languages (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017). Today the official languages of the Republic of South Africa are Sepedi Sesotho, Setswana, siSwati, Tshivenda, Xitsonga, Afrikaans, English, isiNdebele, isiXhosa and isiZulu. Ramrathan (2017) argues that English facilitates communication not only with neighbouring countries, but within the wider context of international discourse. Financial considerations make this language the most feasible medium of instruction after the initial years of primary education (Willemse, Thompson, Vanderlinde, & Mutton, 2018). These considerations include the cost of translating the existing texts into other languages, English and Afrikaans. These are languages in which texts are readily available (Gilleece, 2015).

In recognising the historically diminished use and status of the indigenous languages of South Africa, the state, through the Constitution (1996), undertook to take practical and positive measures to elevate the status of and advance the use of these languages (Statistics South Africa, 2018)**.** The national government and provincial governments would use any official languages for the purposes of government, considering usage, practicality, expense, regional circumstances and the balance of the needs and preferences of the population as a whole or in the province concerned. The national government and each provincial government would use at least two official languages (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017).

It is clearly stated in the Constitution of South Africa (1996) that the national government and the provincial governments, by legislative and other measures, must regulate and monitor the use of official languages (Prinsloo, Rogers, & Harvey, 2018). All languages must enjoy parity of esteem and must be treated equitably. In order to deal with the issue of languages, the Pan South African Language Board (PANSALB) was established. The sole aim of this body was to:

- Promote, and create conditions for, the development and use of all official languages; the Khoi, Noma and San languages; and sign languages; and
- Promote and ensure respect for all languages commonly used by communities in South Africa. These include German, Greek, Gujarati, Hindi, Portuguese, Tamil, Telegu and Urdu, as well as languages used for religious purposes in South Africa, like Arabic, Hebrew, Sanskrit, and others. Ramrathan (2017) argues that the structural conditions under which its Pan South African Language Board (PANSALB) legislation (and subsequent amendments to its legislation in 1999) placed it, as well as political pressures which threatened the independence of the board, have rendered the body instrumentally weak (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017).

The relationship between Pan South African Language Board (PANSALB) and government soured when processes such as the tabling in parliament of the Pan South African Language Board Bill in 1998 unfolded (Slain,

2019). The Pan South African Language Board (PANSALB) was displeased at the fact that it had not been given an opportunity to make known its reservations concerning the amendments (Gilleece, 2015). This undermined the autonomy of the board to such an extent that the first deputy chairperson of Pan South African Language Board (PANSALB), Neville Alexander, resigned from the board in March 1998 as soon as it became clear that its autonomy was under threat. Another important approach to language education policy draws its inspiration from ecological approaches to linguistic diversity (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017).

Problem Study

One of the most dramatic but unplanned consequences of the political changes that took place after the general elections in 1994 as far as the education sector is concerned was the sudden inflow of African-language-speaking learners into schools which had previously been open only to people classified white or coloured in South Africa (North West Province). For reasons that are not entirely clear to us at Multiracial schools or former whites-only schools, this inflow of learners was not accompanied by a redeployment of appropriately qualified Setswana-speaking teachers, especially to those schools where; Setswana-speaking learners became the majority or a sizeable minority of the school population (Maguire, & Delahunt, 2017).

The consequence of this dynamic was and continues to be a situation in which both teachers and learners are virtually not able to communicate in their relations with each other. Since most of the teachers speak English but hardly any Setswana, and most of the learners have either no grasp or, at best, a very imperfect proficiency in the English language, it is almost impossible for them to interact meaningfully. The result is frustration, disillusionment and increasing racial and ethnic prejudice on all sides.

Indications are that the increasing use of English as Language of Learning and Teaching (LoLT) in the Foundation Phase at the expense of learners' primary languages negatively affects teaching and learning in many urban schools (Department of Basic Education, 2016). While the teacher's proficiency in the learners' primary language may perfect the situation, comparative research findings show target language immersion of speakers of low-status languages into a high-status language is a way for failure (Bradbury, 2018). More systematic observation is needed to confirm this trend and to grasp its full implications in classrooms that are themselves becoming increasingly multilingual in composition (Patten, & Newhart, 2018).

The current education system is riddled with inequities; language is an obstacle that comes in the way of learning (Patten & Newhart, 2018). Educationists agree that it is best to teach in the child's mother tongue, but the issue is a complex and emotive one (Statistics South Africa, 2018), given the diverse number of languages and dialects in the country and the attendant linguistic prejudice that politicians are eager to exploit for their own gains (Willemse, Thompson, Vanderlinde, & Mutton, 2018). English, considered the passport to social mobility, is meanwhile becoming the preferred language of instruction among parents, many of who even put their children in unrecognized schools only because their signboards say English-medium (Howie, Combrinck, Roux, Tshele, Mokoena, & Palane, 2017).

Method

This study is a qualitative interpretive case study which adopted phenomenology as an approach for the data collection. Phenomenological approach was considered since it seeks to explore, describe and analyse the meaning of individual lived experience (Terry, Hayfield, Clarke, & Braun, 2017); how they perceive it, feel about it, judge it, remember it, make sense of it, and talk about it with others (Terry, Hayfield, Clarke, & Braun, 2017). The case study was used as it clearly apprehends the valuable information about the teachers' actual challenges of implementing indigenous official African language as a language of learning and teaching in multilingual classrooms. The case study's unique strength is its competency in dealing with a full assortment of evidence-document, articles, interviews and observations, (Etikan, Musa, & Alkassim, 2016).

Participants

These methods were conducted with the two Foundation Phase teachers of the urban and township schools. Purposive sampling was used as a strategy of participant selection which assisted in obtaining the two participants for this study (Etikan, Musa, & Alkassim, 2016). The issues of sampling, ethical considerations as well as the limitations that guided the study are also highlighted (Etikan, Musa, & Alkassim, 2016). I chose the participants who are rich in information and more knowledgeable and informative about the languages of learning and teaching in multilingual classrooms in the Foundation Phase classrooms. All teachers were females and usually female teachers have knowledge of dealing with young learners since they are parents themselves. In general, all the teachers were also older in age. They all had a good reputation for teaching in foundation phase, at their respective schools. Both teachers were home

speakers of Setswana and one was Southern Sotho speaking. These two teachers were from well performing schools, Teacher H-52-F has taught in the same school for more than twenty-three years, while Teacher D-48-F had been working in the same school for eighteen years. Their teaching experience ranges from eighteen to twenty-three years. All the teachers have been serving at their schools ever since they started teaching.

Table 1

Participant Structures

No	Participant Code	Age	Gender	Education level	Seniority	Home language	Teaching Experience
1	Teacher H-52-F	52	Female	Primary Teacher's Certificate (PTC), Further Diploma in Education (FDE) and bachelor's degree in educational management	Post Level 1 Teacher	Setswana	23 years
2	Teacher D-48-F	48	Female	Basic Education Teacher Diploma (BETD), Higher Education Diploma (HED), Bachelor Honours in Education (BED).	Post Level 1Teacher	Southern Sotho	18 years

Data Collection

Data collection was done through observations, interviews, document analysis and field notes. Triangulation was applied in the study to enhance the accuracy of data (Terry, Hayfield, Clarke, & Braun, 2017). Data was solicited from comparison of schools in urban areas with English and Afrikaans as medium of instruction and in rural areas with English and Setswana as medium of instruction. Themes and categories emerging from the interviews, document analysis, observations and field notes were identified and briefly analysed.

Semi-Structured Interview Form

As a qualitative researcher I was solely responsible for all data collected. My professionalism and objectivity are of the utmost importance in order to construct the reality. I used semi-structured interviews, open-ended questions were prepared, which allowed the teachers to share and express their views. At times, additional questions were posed to the teachers with the purpose of clarifying answers or obtaining more information on the research topic. This technique allows the collection of rich and meaningful data. The themes and categories emerging from the data, in conjunction with the relevant literature, assisted in answering the research questions:

- How are languages of learning and teaching in multilingual classrooms taught in Foundation Phase classrooms in the North West Province of South Africa?
- What are the experiences and challenges of teachers teaching in a medium that is not their mother tongue?

Observation

I was physically present but remained uninvolved in the situation. I observed how learners and teachers communicated habitually and most effectively, in their home language and in English. The tools I used to collect my observational data were observation checklists and field notes. I observed the language usage of the teacher, content taught, discipline and interaction with learners, preparation, resources used, teaching approach and strategy applied. These observations occurred on a weekly basis for an hour per class for a period of six weeks, observing the how the languages of learning and teaching in multilingual classrooms are taught in foundation phase classrooms in the North West Province of South Africa.

Document Analysis

Which document analysed, who analysed it.

I analysed learners' workbooks for the evidence of work done. Tests or assessment tasks were also studied. Teachers' lesson preparation was perused and related to what was actually happening in class. Adherence to relevant policy documents was considered.

Data Analysis process

I analysed the data by describing the context of each teacher separately, and how they teach, as well as their beliefs regarding language teaching in Model C schools. I looked at the materials they use during teaching, the arrangement of learners' desks and how their classrooms look inside. I also checked each teacher's professional qualifications, age, as well as their years of experience in the teaching profession. After looking at each teacher's data separately, themes

were then extracted from the data by grouping similar codes together. I then started looking for patterns, similarities and differences between them and accounted for them.

Procedure

I conducted a two-month pilot study in April 2018 while I was engaged in my capacity of lecturer with the evaluation of student teachers during Teaching Practice. This provided me with an opportunity to interview home language teachers in the schools. Since Teaching Practice involves classroom observations after each observed lesson, I was able to conduct focus group interviews with both the experienced teachers as well as the student teachers I was evaluating on how they teach languages of learning and teaching in multilingual classrooms. Two focus group interviews were conducted, and each focus group interview lasted for a period of 30 minutes. I conducted two classroom observations. During this fieldwork I spent a week (2 school days) with each of the two participating languages of learning and teaching in multilingual classrooms teachers.

Results and Discussion

The findings reported in this paper are based on two teachers' responses. We report on our findings as to the problems and challenges facing the Languages of Learning and Teaching in Multilingual Early Childhood Classrooms we visited. The coping strategies of teachers and schools are discussed under the relevant sub-headings below:

Problems in English and Afrikaans Medium Classrooms

Teachers in the urban schools, express frustration at a situation in which they cannot communicate effectively with many of their learners. In a situation in which the teacher understands perhaps half a dozen words or phrases in English or Afrikaans, and the learner knows only enough Setswana to follow the most basic instructions and to answer in monosyllables, interaction between teacher and learner is necessarily stunted.

> *Last year I was desperate because I couldn't make the children understand when they came to school. That first term is crucial. They don't understand English and they don't understand classroom instructions (Teacher H-52-F).*

Learners need a lot of scaffolding if they are to say anything at all in their additional language. This makes for painfully slow communication at times. Often, the teacher's perception that learners will not be able to answer in more than one or two words leads to a teacher-dominated approach to learning. A more extreme example of this occurred at School H, where birthday girl Lesedi is called to the front. There follows an uncooperative discussion in which Teacher H does her best to engage Lesedi in discussion by asking her in English about her birthday how she celebrated it, who was there, what presents she got etcetera. Lesedi is unable to respond except to nod or shake her head reservedly to questions frequently requiring only a yes or no response. While the class energetically sings happy birthday followed by; ke boitumelo go wena. Lesedi has not been given the chance to use her primary language Setswana to express herself in this instance. The result is a shortened communication, frustrating on all sides.

Some teachers blame themselves for not knowing enough Setswana. Others blame parents for enrolling their children in English and/or Afrikaans medium schools without considering the educational consequences. Others, again, hold the Department responsible for forcing schools to enrol children irrespective of their home language a cornerstone of the new language policy. Teacher H, for instance, feels it is unfair on both herself and on the children to be facing each other across a language barrier, *Are Setswana-speaking children not hopelessly confused by being denied their mother tongue? she asks*. She says her job is to teach through the medium of English. She speaks of her inward problem, realising that what children need is the educational use of their home language, knowing she cannot provide it. She also recognises that her job would be on the line if a Setswana-speaking teacher were to be appointed at the school.

Discipline and Control

A noticeable symptom of the communication breakdown between teacher and learners in township classes is the occurrence of discipline problems. *As Teacher E explains, `At the beginning of the year I would speak to them and they don't understand. I will have discipline problems.'* These problems derive from the teacher's diminished authority over her charges at a time when they literally do not speak the same language. Teacher E attributes discipline problems to cultural factors.

> *The children do tend to listen more to someone from their own cultural background. I think they have more respect for that person. Eventually they learn to respect you. (Teacher E interview).*

What is important to note here is the teacher's perception that language competence, cultural background and discipline are linked. Discipline problems were much in evidence in several of the township schools. Some teachers

are forced to spend an inordinate amount of time controlling the children. In one lesson, Teacher E spends roughly one quarter of her time reprimanding the children, mostly in English, once in Setswana.

In Schools E and H, where Setswana-speaking teaching assistants are present, it often falls to the assistant to reprimand a naughty child. In one 45-minute observation period, Assistant H reprimanded individual learners in Setswana 15 times, this in addition to Teacher H's frequent reprimands.

In line with the South African Schools Act prohibition on corporal punishment, teachers see themselves forced to resort to a range of sometimes innovative, sometimes strict measures to control children. Such controlling takes various forms:

> *a verbal reprimand; singling out naughty children for special treatment, e.g. sitting in the front of the class, or standing with hands on head when everyone else is sitting;*
> *(threats of) detention*

By contrast, discipline appears to be less of a problem at School E township, where the teacher shares a home language with the children and appears to related more easily to them, she also lives where they do in the informal settlement next to the school.

The following example serves to illustrate the point regarding the learning programme of Life Skills at School D, which has done more than most to accommodate Setswana-speaking learners by appointing two Batswana (speaking) teachers. With the help of hand-drawn posters which she has stuck on the board, Teacher D tells the story in English of children who are taken to the school doctor for a routine medical check-up. The story is refreshingly appropriate for featuring Setswana names of children Mpho and Lerato and goes some way towards undermining gender stereotypes by presenting a female doctor who is white in addition to the black female nurse. However, at one-point learners are told that Mpho and Lerato did not understand what the doctor said because they don't understand English. Children are required to repeat this line, as they do all the others. In checking for understanding afterwards, Teacher D says to the learners:

> Teacher D: Two children did not understand the nurse; Mpho and Lerato
> Teacher D to one learner: Why didn't you understand the nurse? Learner 2 (Neo, not the one addressed by the teacher): They don't speak English.

Teacher D is being accommodating by addressing one of the learners in Afrikaans in checking for comprehension. There is a delicious irony in the fact that a Setswana-speaking learner demonstrates her knowledge of both English and Afrikaans, whereas `Mpho and Lerato' (who are clearly meant to represent Setswana-speaking children in urban schools) cannot understand English. `Mpho and Lerato' are expected to know English; they don't, so they are seen to have a deficiency. Their home language clearly intended to be Setswana is not considered; they are expected to accommodate the school, rather than the other way around. In this way the teaching of life skills, despite the best intentions of the teacher, ends up strengthening deficit models of education.

Coping Strategies in English and Afrikaans Medium Classrooms

Three coping strategies employed by teachers in the English and Afrikaans-medium classes are briefly highlighted below:

It should be noted that while peer interpreting is common to the two classrooms visited, Setswana language, support, and the language-sensitive grouping of learners were observed in only two schools in each case. The question of how representative these latter strategies are, must therefore remained unanswered. Teachers in the urban classrooms use peer interpreting (Language of Learning and Teaching to Setswana) to bridge the largest gaps in oral interaction in the classroom, typically when it becomes clear that the learner has not understood the teacher's question or instruction. The teacher typically calls on the multi-lingual peer to tell her in Setswana (Teacher H) or `What is that in Setswana' (Teacher H). Most teachers admit this is a desperation measure. We observed the strategy several times during numeracy groups, in which those children fluent in both the Language of Learning and Teaching and Setswana were called upon to interpret for their friends who did not follow.

This impromptu peer interpreting appeared to have mixed results, however, and is not without its problems. In some cases, the interpreter enabled the friend to answer the question; at other times, the interpreter appeared to go beyond the call of duty by giving the answer as well, thereby short- circulating the process. In another instance, the multi-lingual learner appeared to have misunderstood the teacher's instruction:

Teacher H: Everyone on the mat. Put down your pencil. What is that in Setswana?

Learner: Beya pene mo fatshe.

Teacher H: Op die mat.

Teacher H appears to want the learner to interpret *everyone on the mat* into Setswana; the learner has misunderstood this. Teacher H confirms this interpretation by repeating the first instruction in Afrikaans. Later in the same lesson Teacher H asks the learners, `What do you call a doctor in Setswana' When the reply comes *(ngaka),* Teacher H gamely takes up the challenge. `Let me see if I can say *ngaka*.' Children clearly enjoy this validation of themselves.

Language Support

Most of the township schools offer some form of language support to weaker learners. At school E, for instance, all Grade 1 children are tested for their English language proficiency at the start of the year. Those most at risk of failure are given extra lessons in English. Two schools have gone further than most in providing for language support for learners and teaching support for teachers. The schools in question make use of bilingual Setswana or English teaching assistants to perfect otherwise obstinate communication problems of a very basic nature in the classroom. In general, the teaching assistants fill in many of the communication and learning gaps arising from the linguistic mismatch between teacher and learners. In both School D and School E, First Language Setswana-speaking children constitute most learners in the respective Grade 1 classrooms, and struggle with the official language of teaching (English). While Teacher D and Teacher E have made some effort to learn basic vocabulary items and phrases in Setswana, neither by their own admission is able to use Setswana for teaching and learning purposes.

School D, through its governing body, has employed a parent full-time since January 2020 to assist Teacher D with her Grade 1 class. Assistant D performs the following tasks on a day- to-day basis:

> *-interpreting teacher talk for the benefit of those children whose English is weak (English to Setswana), in all three learning areas of the Foundation Phase (FP), i.e. Literacy, Numeracy, Life Skills; interpreting learner talk for the teacher's benefit (Setswana to English); reading and telling stories in Setswana to the class, particularly to small groups of Setswana speaking learners; teaching Setswana sounds (phonics) and vocabulary related to the relevant Foundation Phase organiser, such as the family (e.g. mme - mother); providing translations into Setswana to English sentences that make up the collective news book; helping to control the children through a variety of verbal measures in Setswana such as songs, reprimands, instructions related to classroom logistics such as seating.*

Thus, Assistant D has a considerable degree of co-responsibility for the class. From our own observations and the interviews, the working relationship between Teacher D and Assistant D is a good one. They prepare lessons together each day after school, with Teacher D assuming the main responsibility. However, with Teacher D giving the lead in all respects in the classroom, this cannot justifiably be termed a team-teaching situation. Assistant D's lack of formal teaching qualifications may present an additional obstacle to full equality. At present, Assistant D's role as auxiliary is an important one that has made a major difference.

> *Teacher D, I was very desperate at the beginning of last year. Once I found that I had a helper, immediately the situation eased up, because besides the language there is the cultural aspect. The children do tend to listen more to someone from their own cultural background. I think they have more respect for that person. Eventually they learn to respect you. But Assistant D's presence helps. At the beginning of the year I would speak to them and they don't understand. I will have discipline problems. As soon as Assistant D says something, the whole atmosphere changes. Especially in the first few weeks of Grade 1 it is essential to have a helper, a translator (Teacher D-48-F).*

Assistant D's presence in the classroom, then, can be said to have had a humanising effect: it has improved basic communication between teacher and learners and taken the edge off discipline problems resulting from the communication breakdown Teacher D alludes to. In our observation, Assistant D is often seen by the children as a kind parent figure who quite literally understands the hurts and grievances and needs that Grade 1 children voice in the classroom. Her presence has also enabled learners to express themselves more freely when interacting with Teacher D, notably during news time when children are given the chance of relating a news item to the class.

Above all, the-presence and participation of Assistant D has- introduced the home language of most of the children into the daily life of the classroom. During our visits, an estimated 20% to 25% of all teaching time was in Setswana as a result of Assistant D's interventions. While these are not always planned, and hence do not constitute a systematic dual-language approach, they nevertheless have the effect of challenging School D's official English-only Language of Learning and Teaching policy. One of the more innovative self-made materials we came across was a bilingual (English and Setswana) news book in Teacher D's class. Every day the teacher adds one sentence (in English) generated from interaction with the children. The sentence is translated into Setswana by Assistant D, written into the book. Children regularly have the chance to read (i.e. recite from memory, following the teacher) the book. Here both languages are

validated in an integrative way; bilingualism is promoted, and children literally hear their own voices in Setswana and see it in print.

At School E, Assistant E fulfils a range of tasks largely like those performed by Assistant D, at School D. These include interpreting from English to Setswana for the learners' sake, and occasionally interpreting back from Setswana into English for the teacher's benefit. Assistant E also helps check learners' individual work, reinforcing concepts Teacher E has introduced to the class. On occasion, when Teacher E is unable to be in class, Assistant E takes over this despite her lack of formal training.

> *When I'm not here, they tell me she's taking over. Maybe it's because I'm setting a good example, she's doing what I would be doing. She's actually very good, even though she's not qualified, (Teacher E Interview).*

Two further aspects of Assistant E's work should be mentioned here. The first is that she` spends only approximately half her time in Teacher E's Grade I class - usually the first two hours of every day. The second half she spends in the other Foundation Phase classes (Grades 2 and 3) assisting in similar ways, where her Setswana and English bilingualism is most needed. What does Teacher E do when her Assistant has to leave for another class?

> *Then I do things where I don't have to talk much, where children must do more, such as writing. Or sometimes I'll read stories to them, even if they are in English. Some of them can follow by now, (Teacher E Interview).*

By the teacher's own admission, she is limited in her activities by the absence of her assistant. There can be no clearer indication of the need for ongoing language support in such (multilingual) situations.

A second feature of School E is that Teacher E and Assistant E have evolved an approach to dual language teaching that can usefully be termed duplication or doubling up. Almost everything Teacher E says in English to the class is repeated by Assistant E in Setswana. This occurs particularly when new concepts are introduced, or when known ones are revised, or when instructions are given. For example, Teacher E asks, `How many days of the week?' At a nod from her, Assistant E interprets almost immediately, malatsi a beke ke a makae? One effect of this repetition is that children have two chances, of understanding everything of importance the first time in English, the second in Setswana, the First Language of the majority.

The lesson also takes longer than it would have done if only one language had been used, although this is clearly a price the teacher is happy to pay in exchange for increased comprehension on the part of her learners:

> *The duplication is not really a problem. Especially with Outcomes Based Education: you don't have to go where you want to, but where the child goes. They don't have to be able to add up to 10 by a specific time... Particularly with the interpreting - it may look as if it takes a bit of time, but it helps the time. Once you reach the next grade things will go more quickly with the next teacher, (Teacher E interview).*

Apart from the time it takes, systematic duplication of instructions appears to have the serious consequence of undermining Teacher E's authority in the classroom. Children tune out to Teacher E's instructions and questions in English because they know that these will be repeated in Setswana by Assistant E. When the latter is not their communication becomes very difficult, and Teacher E relies on peer interpreting to convey the most basic information. While this type of dual - language teaching clearly requires some co-ordination in class, it does not necessarily entail joint preparation.

> *We don't really prepare lessons together. Assistant E knows what I do, we simply fit in with each other, (Teacher E interview).*

Assistant H testifies to enjoying the work, for which she is not formally qualified, although she admits to having difficulties with interpreting at times:

> *...sometimes it's very difficult to translate because you forget the word in Setswana or just don't know the word totally in Setswana.*

Unlike Teacher E, Assistant E lives in the township from which most of the children come adjacent to the school. This gives her access to the parents and provides Teacher E with a ready source of information about children's home backgrounds. As Assistant E says, `I always report back to the teacher after I have visited the children at home. Assistant E also plays an important role in translating letters to parents into Setswana.

For Teacher E, an interesting finding to have emerged from the presence of Assistant E is that she has been able to distinguish between language problems, on the one hand, and learning problems, on the other.

> *But it is not only a language question. Some of the children have serious teaming*
>
> *difficulties... No matter what Assistant E and I might do, it simply does not get through to them,* (Teacher E interview).

In our own observation this statement is hard to corroborate. We do not necessarily agree that the form of dual-language duplication practised by Teacher E and Assistant E is making the best use of existing resources. A more effective language distribution in the school day might well make a substantial difference to most learners' motivation and performance. This, in turn, would tend to point towards teaching methodology as a critical factor in affecting learning outcomes including individual bilingualism and would question a too-ready acceptance of learning difficulties amongst children.

Team Teaching

The first two years involved a team-teaching approach where the teachers worked on strategies for making sure that what was being taught was comprehensible to all the children. A challenge has been to get both teachers to treat each other as equals, so that Teacher E becomes as a Setswana speaking role model for the children and staff alike. Another has been to get the Setswana speaking children to feel comfortable enough to use Setswana for educational purposes in the classroom. The first year of the programme, captures both the sense of initiative the two teachers began to develop as they explored working together as well as the self-confidence, she saw being engendered in the Setswana speaking children through this process:

> *Teacher D and Assistant D also tried team teaching at the same time. She would have a group of Setswana speakers and I would have the English speakers. We would use a chant with a sequence of pictures relating to a story. A discussion (in each group, Teacher D Assistant D) about the pictures would follow, encouraging the children to speak out more freely e.g.*
>
> *"Naledi what do you think is happening in the picture numbered 4?" They would then listen to me telling the story. After this the groups would then formulate their own story, using the pictures as a guideline. The two groups then get together and a few children from each group would read their story. I would normally ask a Setswana speaking child to translate their story to the English* speakers. This, I always find interesting because most Setswana speakers' hands would arrow up, to volunteer to translate. This just shows that their confidence is boosted by them getting the concepts and ideas in their mother tongue.

Shortly after Assistant D began work, one of the class teachers began to complain that *the presence of a Setswana speaker and use of Setswana in the classroom, was taking up too much of her time, and was preventing her from teaching the basics to the children.* Her attitude was the exact opposite of the other teacher (Teacher E), and by the end of the first term, *we agreed that it was best to cease engagements with that class.*

Several teachers do not want to get involved with the language issue. Unexpressed fear of losing their jobs if Setswana should become a medium of teaching and learning in school, and a more generally negative attitudes to the value of African languages contribute to a fair amount of hidden racism among staff members in many ex-white and coloured schools. Dynamics such as this will be challenging the education system for some time to come.

Language of Learning and Teaching the Drive for English

In all the urban schools the home language is the Language of Learning and Teaching at Grade 1 level. Some teachers are aware that it is the best way to educate learners. In School D the teacher quoted an example of a learner who was withdrawn from the school to go to a former coloured school, who had since come back because the parents realised that he was not coping. Generally, learners are ahead in these schools in comparison to multilingual urban schools because of the use of the mother tongue, and as the teacher to School D mentioned, because she uses the mother tongue, she can stretch her learners to the fullest. She does not feel that they are too young for anything, and when she-does stretch them the learners surprise her.

Despite urban schools' adherence to the home language as the main Language of Learning and Teaching in the Foundation Phase, there is increasing pressure to introduce English into the curriculum the earlier, the better. Often English is randomly introduced in an oral form at Grade 1 level and there seems to be no clear guidelines as to how much teaching and learning should be done in the home language and how much in English. As a result, teachers rely on their intuitions as to when and how much English to introduce in the Grade 1 classroom.

By way of illustration, in School E the teacher uses mostly Setswana in her Grade 1 class. However, English is also used to teach key concepts in numeracy, such as the operational signs tlhakanya (plus), and numbers from 1-20; life skills concepts such as the parts of the human body (Setswana and English, e.g. tlhogo (head) also chanted in an English rhyme: (*Head and shoulders, knees and toes...),* the five senses drilled in English. e.g. `I hear with my ...?' `Ears'), family names (e.g. mother, brother, sister), for example, and months of the year are derived from the English name, e.g. `June'. A considerable proportion of the print environment is in English (posters - commercial and home-made), while labels on classroom objects appear in two languages, e.g. lobati (door), letlhabaphefo, (chalkboard).

By way of contrast, numeracy practices in the township schools demonstrate the benefits of mother-tongue instruction, i.e. the educational value of the home language in the teaching and learning of concepts. Most of the time

teachers use the question and answer method to teach numeracy. Word sums are discussed in the home language and children are encouraged to count mentally (in their heads). In one class learners have no problem with counting from 1-50; impressively, some even manage it backwards. In School D, Teacher D explains the meaning of the multiplication concept in Setswana, moving from addition to multiplication. Learners could work out several sums which we thought were rather difficult for Grade 1. The teacher explained that the learners have no problem understanding because their language is known to them. Sometimes the teacher uses Setswana because there are some children who have Setswana as a home language.

Multilingualism, Language Varieties and Pronunciation

In the urban schools, learners are exposed to a few African languages besides Setswana, in such a way that they do not know at times that they are using a Sepedi or Sesotho word. The problem with this is that the teachers want the learners to speak their home language without mixing it with any other. In School F the teacher was asking learners to describe what they saw in some pictures of the OBE workbook. One picture was that of a lefesetere (window) and one learner bravely said `ke bona lefesetere' (I see a window). The teacher was quick to correct the learner. She said that lefesetere is not a Setswana word. Another learner said ke- window. The teacher again told them that is still not a Setswana word. In the end one learner said letlhabaphefo and the teacher was satisfied with the answer. This insistence on the standard variety does not appear to encourage multilingualism, however; nor would not help in the development of African languages. Teachers want learners to speak African languages correctly without using any borrowed words, or other words from other African languages that refer to the same thing.

In School E the teacher mentioned that her main problem was with the learners who mixed Setswana and isiZulu. She said as soon as she realises that a learner has weak Setswana then she will make sure that she gives her as much attention as possible. According to her the learners are immersed in isiZulu environment, so their parents have sent them to School E so that they can learn isiZulu and even though she has some learners who speak isiZulu she uses Setswana most of the time. She tries though to accommodate the Zulu speakers because she can speak Setswana, but then she said just like us who spoke a language other than Setswana and we could understand what was going on in the classroom, even the Setswana speakers understand.

The teacher at School E appeared to accommodate some of the Zulu speakers, even though it is a Setswana school. One day she was teaching about boys and girls and then she drew pictures to show what they looked like. She then came to us to ask for their Zulu spellings. Even when she gives individual learners attention, *she says that I must speak Zulu to this one because she has forgotten Setswana.* I suppose she is doing this subconsciously. She would not speak to the Setswana learners in Zulu, probably for the same purist reason mentioned earlier.

In the schools where there are learners who speak a language other than the one that is used as the medium (Schools D and E) the teachers have communication problems. For example, when the teacher tries to teach vowels e.g. -o-, it becomes difficult. The OBE workbook the teacher has been supplied with assumes that -o- will be pronounced the same in all languages, yet this is not the case. In some African (Nguni) languages for instance, it is pronounced -u-.

The same applies to the pronunciation of some consonants. In Teacher E's language lesson, for example, the syllable - li- is pronounced -di- but then the teacher has to accommodate some of the learners who speak Sesotho, and who pronounce the syllable as it is. Other sounds which pose problems are -r- and -g-. Learners at times transfer the Setswana or Sotho pronunciation of this sound to English. Another word where learners tend to transfer pronunciation is `three' and in School E for instance, the teacher took some time trying to teach her learners not to say `free' instead of (three). Even the teacher herself struggles to pronounce this sound, but because she is the model for the leaners, they will accept what she says is right. Closely related to this problem is one about accents. For instance, in Setswana learners find it difficult to pronounce the syllable `the', transferring their Setswana pronunciation `de'.

Problems Common to All Classrooms Visited

Literacy and the Phonics Focus

Teachers testified that of the three learning programmes for the foundation phase, literacy, and phonics presented the most problems. Every teacher spends large chunks of her time on literacy activities which centre around the phonics philosophy of sounding out letters and words and in the process moving from part to whole via pattern drills, both orally and in writing. A typical example would be for the teacher to ask children to identify initial sounds, middle sounds and final sounds in semantically unconnected words such as man, cat, bag, wag, sing, six, ten, bang, pot (in English), or to ask children to come up with their own words featuring a particular letter such as -g-, e.g. gana, gama, gasa, gafa (in Setswana). Children are immediately bored to distraction by the repetition of sounds and letters, and the effort of bringing the two together in decontextualised settings.

What is physically clear to the observer is the unbearably slow pace at which learning happens when phonics is taught, especially in additional language environments. Boonk, Gijselaers, Ritzen, & Brand-Gruwel (2018) note that even First Language users of Language of Learning and Teaching often have difficulty with phonics. This problem is exacerbated in English Second Language contexts, since English is only approximately 70% phonically regular and many of the most frequent words (e.g. the, once, enough) and even some names (e.g. John, Johana) cannot be decoded by sounding out the letters that make up the words. In our observation, all the teachers in the township schools experienced difficulties when teaching phonics. It is hard work and yields low return. The merits or otherwise of a phonics-dominated approach to print are not at issue here (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018).

What is important to note is the difficulties teachers in linguistically diverse classes encounter with phonics, especially in English, but also in Afrikaans. A complicating factor here is that of pronunciation. When a child calls out `Jam Alley' and the teacher understands this to have been `Germany', pronunciation becomes an issue: the unexpected for the teacher flattening of the -a- vowel results in a momentary miscommunication. In this context phonics becomes synonymous with a variety of standard spoken South African English, and takes little, account of children's own pronunciation. Thus, on occasion pronunciation becomes an issue in the multilingual classroom, when teachers feel that it may confuse children with their spelling if not checked. Teacher D is quite explicit that this is the reason, whereas Teacher E implies it when correcting children's pronunciation of *tin*, which to her sounds like *teen,* (feel and fill, meat and meet).

Since the learning area of literacy is dominated by phonics very little time remains for stories. Stories often become gap-fillers at the end of the day once the real work has been done and children are restless. For stories serve to quieten children down. For example, Teacher D says she reads one page of one story to her class per day, at the end of the day when children cannot concentrate anymore. In the township schools, there are often no books for children; and even when there is a story book or two, it is the teacher who reads to the children. While all teachers make some use of stories, their potential for literacy learning remains largely unfulfilled. As Slain (2019) points out, hearing and telling stories has shown itself to be the single most effective approach to promoting literacy in young children in South Africa and elsewhere. Approaches to literacy in the urban schools are similarly characterised by a move from part to whole. Teachers typically start by teaching vowels, then single consonants, double consonants, and finally complete words. At the start of the year a heavy emphasis is placed on writing patterns so that children learn how to hold a pen. In most of the schools that we visited, learners were mostly taught to identify vowels and consonants. We observed very little reading activity and very little writing. Most of the time the teachers use the question and answer method and the lessons were done orally.

Teachers in the urban schools at least have the advantage of sharing the same home language/s with the children. While pattern drills are the order of the day (e.g. copying the letter -r- many times neatly between the lines of a worksheet), the use of children's home languages coupled with more learner-centred methods occasionally facilitates a more creative lesson in which children are enabled to express themselves. During a reading lesson at School E the teacher translated a story written in English, The Little Red Hen, into Setswana. She employed role play in the home language which added greatly towards understanding the story. It was interesting to see learners choose the roles they want to play, instead of the teacher assigning them.

In School D the teacher uses the breakthrough method to teach reading and writing. Children are made to form their own sentences and thereafter use them to practise writing. They construct and read the sentences as opposed to reading or copying what has been prepared by somebody else. This makes space for creativity and imagination because learners can pick words and make sentences. Small groups are also formed to give learners individual attention and each learner is supposed to go to the front and write his/her own sentence. The teacher insists that when children read words, they should point at them. She emphasises that reading should not just be singing, learners should separate the words.

However, poor teaching methods often undermine intended outcomes of literacy lessons even when the home language is used. In School E, for example, we observed a lesson where the teacher was teaching learners how to write the letter -d-. She drew a picture of a duck and used it to illustrate how the -d- was to be written. She explained the concept in Setswana and emphasised that the *duck* should face the front and its tail should be at the back and its feet should be long. The method was a little confusing because when the learners attempted to write their own *-d-* on the board, they tried to decorate it in imitation of the teacher's illustration. The teacher's strategy was to take those ahead to teach them first; she said they would help to teach the slower ones. The rest of the class was watching and not concentrating on what she was doing. When the first group was called to come and write on the board, they still did not know how to write the ***-d-.***

Teaching Methods

In teaching all the above, teachers most of the time teachers use the question and answer method. The teacher is still considered all knowing, and learners come to school to listen to what the teacher must teach them. Even though in some of the schools we visited the teachers and learners all spoke one language (Setswana, Sesotho, or Sepedi, respectively), there were some communication problems that we observed. In School D the teacher was teaching the learners to make a distinction between left and right and she said that *`the right hand is the one that you use when you eat.'*

On a more general level, while it was not the intention of the research to evaluate teachers' performances it proved impossible to avoid noticing that on the whole teachers fared poorly as facilitators of learning. Notwithstanding constraints such as large classes and the demands of the new curriculum, teachers generally do not measure up against the following guidelines of what we considered to be good practice: *acknowledging the different languages and dialects in the class (language awareness); working with existing multilingualism in the classroom, i.e. drawing on learners' existing languages as learning resources; managing learning in groups; creative use of learning materials; enabling cognitively demanding learning to take place.*

Children are consistently underestimated by teachers in terms of their cognitive or intellectual capacity. This was most evident where Language of Learning and Teaching is not an obstacle i.e. in the township classrooms but extends to urban classrooms also and includes reading, writing and numeracy lessons, where in some cases children after 8 months of schooling were still adding up 2+2. Even in those relatively privileged classrooms with only 30+ learners, the teaching approach was invariably teacher-centred and allowed for very little initiative on the part of the children. It is clearly a case of outdated teaching approaches that have not been challenged thoroughly enough and asks awkward questions of the teaching methods and literacy approaches passed on by teacher education colleges in the last decade. For longer serving teachers, in-service provision in the last few years has clearly also failed to change ingrained practices in this regard. While teachers exert themselves to the utmost, often under extremely trying conditions, learners are rarely fully engaged. The result is a tragic waste of human potential (Statistics South Africa, 2018)**.** While much teaching happens, very little learning appears to occur. However, teachers should not be made the scapegoats for this systemic failure, which clearly requires a systemic response (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018).

School Language Plans and Policies

Our final round of visits confirmed an earlier impression namely that none of the schools had consciously aligned their language plans, policies and practices with the new Language- in-Education Policy**,** which by that stage had been made public for more than a year. All schools do have a language policy of sorts, even if by default. However, this appears to have evolved more in response to, realities on the ground over the past few years, such as staff language proficiency and parental preference for high status languages, than as a result of any contextualisation of the new Language- in-Education Policy.

Concretely, none of the schools was able to state that they had arrived at a new integrated policy for language/s of learning and teaching, languages as subjects, languages of administration, assessment, and staffing. Several of the teachers interviewed indicated, that the school had not-yet received a copy (Schools D & E), or that teachers were left to decide on their own language plan (School D) within the general guideline of maintaining the mother tongue in the Foundation Phase while introducing English orally (in Grade l) and in writing (in Grade 3). One School (F) has had a consultation, but this has thus far led nowhere due to the absence of a constitution for the school. Of the urban schools, Schools D and E have moved some way towards promoting multilingualism via the Setswana-speaking language support staff, and by appointing two bilingual (First Language Setswana speaking) staff members, respectively.

Recommendations and Conclusion

The implications for the improvement of teaching and learning both in linguistically diverse and in linguistically homogeneous classrooms and schools, are clearly numerous, and the challenges enormous if the aims and objectives of the new language- in-education policy and of the new curriculum are to be realised (Statistics South Africa, 2018). Many of these implications and challenges have already been identified and explicated more fully by, amongst others, (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018) and by the national Department of Education through its recent Implementation Plan (1998), Department of Basic Education (DBE, 2011), who between them have produced a small but growing repertoire of strategies for use in particularly multilingual primary school classrooms (Slain, 2019).

At Classroom Level

For teachers at classroom level, the biggest challenge would be to shift their beliefs about, and attitudes towards, the African languages, and to use these as learning resources across the curriculum and throughout schooling. African languages should come to be viable codes for learning at all levels. Most immediately, teachers in multilingually

composed classrooms should create forms of language awareness appropriate to their situation. Doing an informal survey of the languages, learners speak, and finding space to play, with the different languages, would only be the first steps in affirming them, and thereby their speakers. Many of the suggestions listed by (Maguire & Delahunt, 2017), are relevant here, such as collecting stories and books and other resources in the languages that learners speak and encouraging children to use their home languages in the classroom (Gilleece, 2015). Forms of cultural awareness could fruitfully complement such language awareness campaigns. To combat growing xenophobia and promote tolerance, such awareness programmes could be extended to urban schools, particularly those which have admitted black newcomers from other African countries.

The attitudinal shift required of speakers of African languages is even more profound if bilingual and multilingual learning is to flourish. Teachers in urban, classrooms should be encouraged to regard the mother tongue or home language as the main vehicle for cognitive and emotional growth, certainly in the General Education phase (Grades 1-9), Department of Basic Education (DBE, 2011). Amongst other things, this means promoting literacy practices and doing (written) assessment in African languages beyond the Foundation Phase. It is vital that children learn to read and write at cognitive demanding levels in their home languages across the curriculum, and to have the choice of being assessed in their home language from Grade 4 upwards.

Teachers in linguistically diverse classrooms should also be encouraged to explore the grouping of their learners in linguistically sensitive ways that encourage co-operative learning via peer interpreting. It is vitally important that African language speaking children not be stigmatised by being segregated into their own groups throughout the school day. Furthermore, teachers in such classrooms should rope in parents and other volunteers as teaching assistants wherever possible, particularly in order to bridge intractable language-related communication problems.

At School Level

Many of the steps indicated above will only become fully possible once a school develops its own language plan in keeping with the new Language -in- Education Policy and the new curriculum and finds ways of monitoring its realisation and supporting teachers in doing so. School management through the governing body plays a pivotal role in this regard and will have to convince parents of the merits of using the home languages as vehicles of learning plus transition to English and/or Afrikaans, amongst other things. Additional aspects schools should be considering include the following:

- Conduct a language survey to determine the home languages of learners and parents' preferences.
- Organise training for peer interpreters in schools where teachers and significant numbers of learners do not have a language in common.
- Appoint language volunteers, e.g. from the ranks of retired teachers or parents.
- Share resources with neighbouring schools by clustering (minimally twinning) - this could lead to an exchange or sharing of teaching materials; marking loads; exam & test question-papers; language (and other) expertise.
- Introduce Setswana as a subject in urban schools.
- Appoint Language of Learning and Teaching speakers of African languages urban schools, not only for teaching Setswana as a subject but as class teachers (Foundation Phase) and subject teachers (Intermediate Phase upwards).
- Introduce family literacy classes or courses.
- Link up with Non-Governmental Officials to promote quality education and teachers' reflective teaching practice. Mechanisms need to be found to encourage English- and Afrikaans-speaking teachers to do conversational courses in the most relevant-African language.

In addition, primary school teachers should be targeted for English enrichment lessons in order to meet the demands on teaching their learning programmes and subjects through the medium of this language. While the need is greatest amongst Language of Learning and Teaching speakers of African languages (i.e. teachers in township classrooms), many Language of Learning and Teaching) Afrikaans-speaking teachers in the Foundation Phase and upwards who have been compelled to teach through the medium of English should also be included. All subject advisers concerned with the township schools should be competent users of the relevant African language. Teachers feel strongly that unless existing English and Afrikaans-speaking subject advisers are replaced by Setswana-speaking (or isiZulu-speaking, where relevant) counterparts, subject advisers will continue to have very little to offer the township schools.

At Teacher Education Level

The promotion of multilingualism in re-service and in-service courses is crucial to the enterprise of facilitating multilingual learning. Non-Governmental Officials could and should liaise with other role-players (e.g. via the In-

service Providers' Coalition) in bringing pressure to bear on the provincial and national education authorities to restructure Inservice Training and Post Training service in accordance with the aims outlined above. Also, a coherent new set of language requirements for teachers teaching in public schools needs to be developed following the scrapping of the requirements for teachers. Teacher education courses will need to be aligned with these. The goal should be to enable all teachers to teach competently through the medium of two languages.

In partnership with the relevant provincial education authorities, teacher in-service providers should be offering courses in which the intersection of multilingualism with Curriculum 2005 is systematically explored. Various key constituencies should be identified (Boonk, Gijselaers, Ritzen, & Brand-Gruwel, 2018). Besides teachers and principals, these would include subject advisors and circuit managers. The provincial language managers envisaged by the national Department of Education in its Implementation Plan for the new Language- in-Education Policy will require structured assistance from Non-Governmental Officials and other providers (Ramrathan, 2017).

The development and distribution of appropriate learning support materials such as textbooks, stories, charts and posters, amongst other things, in the African language (or in two or more languages) remains an urgent undertaking. Some work has already been done at Foundation Phase level. This needs to be developed and extended to the greater demands of subject (or learning programme) specific teaching from the Intermediate Phase upwards. It would also be important to monitor the quality and relevance of the many materials that publishers are taking directly to the schools.

Finally, a national terminology databank for the African languages should be set up in partnership between national and provincial education departments, publishers and writers of learning support materials, academics and other stakeholders. The goal would be to collect and make available terms currently being coined by teachers and other practitioners in the Nguni, Sotho, Venda and Tsonga languages, for purposes of acquisition. It is crucial to complement corpus planning from above units with spontaneous corpus planning from below in order to legitimise and extend the use of African Languages in high status schooling domains such as content-subject teaching and textbooks.

Limitations of Study

The article was extracted from my doctoral study. Due to logistical and financial constraints, this study was limited to two foundation phase schools and eight foundation phase teachers in North West Province of South Africa. The inclusion of more schools from different geographic contexts teaching different indigenous South African languages would have extended this study. Also investigating the teaching of learning languages in multilingual classrooms across all the grades is essential in order to have a deeper understanding of multilingual teaching in South African schools. The period available to conduct this study was also a limiting factor on the depth and scope. It should be noted however that the result of this qualitative study cannot be generalised but may be transferred to similar cases.

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Related research

Phajane, M.H. (2020). Mother Tongue Language as Medium of Instruction and Promotion of Multilingualism: The South African Language Policy. *Journal of Critical Reviews, 7*(14), 98-107.

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Research Article

Maternal relationships and motivation in gifted children[1]

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Abstract

This study primarily investigates gifted children's and their mothers' acceptance-rejection and control perceptions and children's achievement motivation. The study was carried out with 5th and 6th year students attending Science and Art Centers in two cities in Turkey, and their mothers. The sample of this research consists of 226 students (103 girls and 126 boys) who attend Adana and Mersin Province Science and Art Centers in the 2014-2015 academic year, and 179 mothers. As data collection tools, Turkish Parent Parental Acceptance-Rejection Questionnaire/Control: Child (Short Form), Child Parental Acceptance-Rejection Questionnaire/Control: Mother (Short Form), and Scale of Motivation in Education were used. The results of the study showed that children and mothers perceived high level acceptance, low level rejection and mid-level control in their mother-child relationships. A significant difference was observed between mothers' and children's perceived parental acceptance-rejection and control. It was also seen that children's identified external motivation and intrinsic motivation levels were high and amotivation and introjected external motivation levels were low.

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Introduction

Families have an important role on gifted children to develop their abilities that they have. Academic and positive environment at home raises child's curiosity and furthers his academic interests (Campbell and Verna, 2007), so parents are guiding force in child' lives (Lindenfield, 2011). Parents whose children are gifted and high achieving show interest to their children they determine high objectives for their education (Clark, 2013, p.275).

Mother-child relationship was considered as a determining factor in child's personality development by Freud for the first time. The quality of the relationship with mother and mother's perception of child have been thought to be influential on person, himself and his perception of environment and his future relationship in his adolescence (Halisdemir, 2013, p.2, 3). Mother-child relationship was considered in the Attachment Theory by John Bowlby in 1969. According to this theory, why emotional connections human beings need to establish with each other is taken into account and it is mentioned that the relationship between mother and child is important on child's security feeling and psychological development (in Kaya Balkan, 2009, p.4).

There are studies showing that parenting attitudes are related to academic achievement in the related literature. In a study by Kağıtçıbaşı, Bekman and Sunar (1993), it was found that children whose mothers were well-educated had higher achievement when compared to others. Studies showed that democratic parenting influenced academic achievement positively (Arslan, 2008; Yılmazer, 2007). Bourgeois (2012) found out that children whose parents had autonomy-supportive attitutes showed higher achievement. Children's perception of mother acceptance level affected their school performance (Gençtoprak, 2010; Yener, 2005). Kim and Rohner (2002) claimed that there was no link

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between parenting styles and children's academic performance but the more children received warmth and affection from their mothers, the more successful they were at school. In the same study, it was found out that mothers' inclusion into educational process and perceived mothers' warmth were related to academic scores. Similarly, as children's perceived mothers' acceptance increased, their school performance got better. This current study investigates children's relationships with their mothers and their achievement motivation in terms of parental acceptance-rejection theory.

Parental Acceptance-Rejection Theory

Parental acceptance-rejection theory (PARTheory), this is a socialization theory which explains the background, the related things and the results of parental acceptance-rejection theory (Rohner, Khaleque & Cournoyer, 2008, p.14). In 1960, Rohner started to search whether parental acceptance-rejection theory depends on culture or whether it is universal or not in different parts of the world and in different societies. The results of studies showed that parental acceptance-rejection is independent from class, race, ethnicity and culture and shows similar effects in all over the world (Rohner, 2000, p.67, 68). The theory proposes that the parental acceptance-rejection has deep effect on children's personality development during all their life. It also proposes that it is a main motivation for children to receive confirmation from parents and other important people around (Rohner & Khaleque, 2002, p.4).

In the theory, the parental acceptance-rejection makes up of warmth/affection dimension of parenting. The perception of parental acceptance-rejection by children is a continuum. There are expressions about parental acceptance on one end of the continuum and there are verbal positive and negative expressions about parental rejection (Rohner et al. 2008, p.5). Parental acceptance symbolizes warmth, love, affection that parents show to their children. The physical expressions of love appear through behaviours such as kissing, hugging and cuddling whereas verbal expressions of love come in utterances including praisal (Rohner, 2000, p.19, 20). Parental rejection is represented through lack of warmth and love or drawing back. Rejecting parents do not love and confirm their children. Also, they see their children as a load and compare them to others (Rohner, 1975, p.45).

According to the PARTheory, behaviour control means regulating, guiding or managing children's behaviours by their parents (Rohner & Khaleque, 2003, p.2). Behavioural control is handled in four categories: a) Low/lax control where parents rarely control their children's behaviours; b) Moderate control where parents sometimes control their children's behaviours; c) Firm control where parents generally control their children's behaviours; d) Strict/restrictive control where parents almost always control their children's behaviours and they expect their children to obey themselves (Rohner & Khaleque, 2008, p.107, 108).

The effect of parents' behaviours is shaped in child, himself, through the perception of the child. The results of the studies showed that parents and children do not have the same perspective about parents' love, needs and punishments. Parents often had wrong arguments about children's perceptions of parents (Rohner, 2000, p.24-27). Similarly, according to White (2009), gifted children expressed that they had positive relationship with their parents, however, parents of gifted children claimed that they had significantly more positive relationship with their children than expressed by their children. These children mentioned that their relationships with their mothers are better than their relationship with their fathers.

Another influential factor on academic achievement is motivation. High motivation is the characteristic that is observed in gifted children at most (for example: Chan, 2000). Phillips and Lindsay (2006) said that both internal and external motivation are important on students' achievement. Bourgeois (2012) added that gifted children with high motivation have high internal and external motivation.

Motivation: Self-Determination Theory

Self-determination means a person's internally and externally motivated behaviours stemming from his self-identity feeling based on his choices (Deci & Ryan, 1985, p.154-157). Self-determination theory aims at identifying factors which increase the innate potential, adaptation and well-being of an individual. Also, it is concerned with the processes and conditions which help and motivate individuals' groups' and communities' healthy development and effective work (Ryan & Deci, 2000a). In self-determination theory, the basic distinction is between intrinsic and extrinsic motivation among different motivation types which are based on different reasons. Intrinsic motivation is concerned with accomplishing tasks because they are enjoyable, interesting and unique whereas extrinsic motivation involves in doing something (Ryan & Deci, 2000b).

This theory starts to analyse from the situation of being demotivated in which there is no external regulation to extrinsic motivation which includes more self-determination regulations and to intrinsic motivation. It concentrates on the effects of internalisation and integration processes on the differentiation of the extrinsic motivation. The results

of the studies show that social environment supported by self-determined motivation provides the most convenient conditions for high quality education (Rigby, Deci, Patrick & Ryan, 1992, p.182).

Motivation is one of the descriptive characteristics of giftedness for gifted children. However, there are studies which show that gifted children's motivation is low and this is related to academic failure. Therefore; it seems important to analyse the factors which are influential on motivation. Low motivation may derive from different reasons such as family, school system, the self or environment. In this study, it has been thought important to focus on mother-child relationship and gifted children's motivation to develop their skills and for their healthy development.

Aims of the Study

In this study, in mother-child relations of gifted children; how mothers and children have perceptions of acceptance-rejection and control; whether there is a difference between the acceptance-rejection and control perception levels of mothers and children, and children's achievement motivations were examined.

The research main question is below;

What are the acceptance-rejection and control perceptions, and the children's achievement motivation levels of gifted children and their mothers in mother-child relationships?

And the sub-questions of the research are below;

- Is there a significant difference between the perceived acceptance-rejection and control perception levels of gifted children towards their mothers and the perceptions of acceptance-rejection and control perceived by mothers towards their children?
- What are the achievement motivations of gifted children?

Method

Research Design

This research, which examines the mother-child relationship and motivations of fifth and sixth grade students attending the Science and Art Center and their mothers, is quantitative research in the correlational survey model.

Participants

229 fifth and sixth grade students (103 female (45%) and 126 male (55%)) attending the Science and Art Centers in the 2014-2015 academic year in Adana and Mersin, two cities in the south of Turkey and 179 mothers participated in this study. The Science and Art Centers are educational institutions supporting gifted children. These are the special independent educational institutions to raise gifted children/students' awareness about their individual abilities and to guide them to make the most of their capacity (Ministry of the National Education Guidebook, 2007). Children who can pass the special ability examinations given by the Ministry of the National Education are accepted into these centers.

Data Collection Tools

Turkish Parent Parental Acceptance-Rejection Questionnaire/Control: Child (Short Form), (Turkish Parent PARQ/Control (Short Form)

Turkish Parent PARQ/Control (Short Form) evaluates mother's perception of acceptance-rejection of her child (Rohner, 2008, p.43). Also, regarding her child's behaviours, it considers mother's perceptions of her own wishes, directives, rules, orders, prohibitions and her insistence on following these (Rohner & Khaleque, 2008, p.107, 108). Official permission was received from the Center of Ronald and Nancy Rohner (Ronald and Nancy Rohner Center for the Study of Interpersonal Acceptance and Rejection) to use the Turkish Parent PARQ/Control (Short Form). The inventory has 29 items and 5 sub-dimensions. The sub-dimensions are warmth/affection, hostility/aggression, indifference/neglect, undifferentiated rejection, control. The Turkish Parent PARQ/Control (Short Form) has a grading system of 4 Likert scale. The low scores received from the PARQ sub-dimensions means acceptance and high scores implied rejection. Parent Parental Acceptance-Rejection Questionnaire was adapted into Turkish by Anjel (1993) and its reliability and validity studies were completed. The short form of the Turkish Parent PARQ Control was translated by Selenga Gürmen (2012) and the control sub-dimension was translated into Turkish by Işık (2014).

In this research, the Cronbach Alpha values of the sub-dimensions of the Turkish Parent PARQ/Control (Short Form) was found to be .66 for warmth/affection, .69 for hostility/aggression, .39 for indifference, .15 for undifferentiated rejection, .52 for control. In this study, the undifferentiation rejection sub-dimension of the Turkish Parent PARQ/Control (Short Form) was not taken into account as its reliability was found to be low.

Child Parental Acceptance-Rejection Questionnaire/Control: Mother (Short Form)

(Child PARQ/Control: Mother (Short Form): Informed consent was received from the Center of Ronald and Nancy Rohner (Ronald and Nancy Rohner Center for the Study of Interpersonal Acceptance and Rejection) to use the questionnaire. The Child PARQ/Control: Mother (Short Form) measures 9-17 aged children's perceived mother acceptance-rejection and their mothers' perceived behavioral control (Rohner & Khaleque, 2008). It was prepared parallel to the Turkish Parent PARQ/Control (Short Form). Child PARQ: Mother was adapted into Turkish by Polat (1988) and its validity and reliability studies were completed. Child PARQ/Contro: Mother (Short Form) was adapted into Turkish by Erkman, Gülay and Avaz (2012). In this research, the Cronbach Alpha values of the Child PARQ/Control sub-dimensions were found to be .81 for warmth/affection, .64 for hostility/aggression, .74 for indifference/neglect, .65 for undifferentiated rejection and .43 for control.

Scale of Motivation in Education (SME)

Academic Motivation Scale was originally developed in French by Vallerand and his colleagues in 1989. It measures primary school students' motivation towards education (in Kara, 2008). This scale was adapted into Turkish by Kara (2008) as "Eğitimde Motivasyon Ölçeği" in Turkish (Scale of Motivation in Education). The Turkish adaptation of the scale has 12 items, 4 sub-dimensions and 3 point Likert scale. As the sample of this study consisted of the 5th and 6th graders. The Turkish adaptation of the inventory had 12 items, 4 sub-dimensions and 3-point-Likert scale. However; as the sample of this study consisted of 5th and 6th graders, Kara suggested using 5-point-Likert scale as in the original form, so it was decided to use 5-point-Likert scale. In this research, the reliability scores of the Scale of Motivation in Education sub-dimensions were found to be .81 for identified external motivation, .75 for amotivation, .73 for introjected external motivation and .88 for intrinsic motivation.

Procedure

For this research, the official permission was obtained from the Ministry of National Education, General Directorate of Special Education and Guidance and Counselling Services, Adana and Mersin Provincial Directorates for National Education in order to conduct the study in Adana and Mersin Science and Art Centers with the 5th and 6th grade students. Before the data collection was started, the appointments were taken from the directors of Adana and Mersin Science and Art Centers. The data collection was completed by the researcher and the mothers were contacted through their children and the inventories were sent to the mothers by their children. The directors, the teachers and the administrative staff of the schools helped to collect data from the mothers. It tooks 20 minutes for the students to fill in the inventories. Which years? Or educational term (Given in the Participants section)

Data Analysis

The data from the Turkish Parent PARQ/Control (Short Form), Child PARQ/Control: Mother (Short Form), the Scale of Motivation in Education and the Mother-child data collection forms were transferred to the computer and analysed through the SPSS (Statistical Package for the Social Sciences). The significance level was accepted as .05. Kolmogorov-Smirnov and Shapiro-Wilk test were used to understand whether the inventories showed normal distribution or not, so non-parametric tests were used to analyse the data.

Results

This section includes the analysis of the data collected in the research and the findings obtained from these analyzes.

Findings on Acceptance-Rejection Perceptions and Control Levels of Gifted Children and Their Mothers

An analysis was made to determine the acceptance-rejection levels perceived by the mothers about their own behaviors in the mother-child relationship and the acceptance-rejection levels perceived by the children in the mother-child relationship, and the values of n, x and Ss are given in Table 1.

Table 1

Turkish Parent PARQ (Short Form), Child PARQ: Mother (Short Form); n, $\overline{X}$ and Ss Values for Sub-Dimension Points

	PARQ Possible Scores			PARQ Mother			PARQ Child		
	Lowest	Highest	Midpoint	n	$\overline{X}$	Ss	n	$\overline{X}$	Ss
Warmth/Affection	8	32	20	179	8.99	1.73	229	9.97	3.07
Hostility/Aggression	6	24	15	179	8.53	2.52	229	8.04	2.39
Indifference/Neglect	6	24	15	179	7.84	1.92	229	8.07	2.52
Undifferentiated Rejection	4	16	10	-	-	-	229	4.76	1.38

Source: PARQ Possible Scores, Rohner (2008).

As seen in Table 1, the mothers' warmth/affection sub-dimension mean value is $\bar{X}$=8.99 and their hostility/aggression mean value is $\bar{X}$ =8.53. The mothers' indifference/neglect sub-dimension mean value is $\bar{X}$ =7.84. In this research, the Turkish Parent PARQ (Short Form) undifferentiated rejection sub-dimension was not considered as its reliability was found to be low. According to Table 1, the mean value of the warmth/affection sub-dimension is $\bar{X}$=9.97, the mean value of hostility/aggression is $\bar{X}$=8.04, the mean value of indifference/neglect is $\bar{X}$=8.07 and the mean value of undifferentiated rejection is $\bar{X}$=4.76. In line with these results, it can be said that there is a perception of high-level acceptance but low level rejection in mother-child relationships in this study.

The scores of the mothers otained from the PARQ / K-Mother's control sub-dimension and the children's scores (obtained) from the Child PARQ / K-Mother control sub-dimension were analyzed according to the evaluation criteria and the frequency and percentage distributions according to the control levels are given in Table 2.

Table 2

Frequency and Percentage Values According to Control Sub-Dimension Levels of Mothers and Children

Control Levels	For Mothers		For Children	
	f	%	f	%
Low/Lax Control (5 to 9 points)	7	3.9	17	7.4
Moderate Control (10 to 14 points)	82	45.8	140	61.1
Firm Control (15 to 17 points)	72	40.2	58	25.3
Strict/Restrictive Control (18 to 20 points)	18	10.1	14	6.1

As seen in Table 2, 7 mothers (3.9%) perceive controlling their children's behaviours as low/lax control, 82 mothers (45.8%) perceive as moderate control, 72 mothers (40.2%) perceive as firm control, 18 mothers (10.1%) perceive as strict/restrictive control.

When Table 2 is considered, it is seen that 17 children (7,4%) perceive their mothers' controlling their behaviours as low/lax control, 140 children perceive as (61.1%) moderate control, 58 children (25.3%) perceive as firm control and 14 children ((6.1%) perceive as strict/restrictive control.

Accordingly, it can be said that both mothers and children perceive each other's controlling as mid-level, moderate control and firm control, which are between low/lax control and strict/restrictive control.

The results of the Mann-Witney U test conducted in order to determine whether there is a significant difference between the levels of acceptance-rejection and control that the mothers perceive about their own behaviors and the children perceive from their mothers are given in Table 3.

Table 3

Turkish Parent PARQ (Short Form), Child PARQ: Mother (Short Form) Mann-Whitney U Test Results on Sub-Dimension Scores

(Sub-dimension)		n	Mean Rank	Sum of Ranks	U	z	p
Warmth/ Affection	Mother	179	165.06	29546.50	13436.50	-2.874	.004**
	Child	179	193.94	34714.50			
Hostility/ Aggression	Mother	179	189.66	33950.00	14201.00	-1.890	.059
	Child	179	169.34	30311.00			
Indifference/ Neglect	Mother	179	179.04	32048.50	15938.50	-.086	.932
	Child	179	179.96	32212.50			
Control	Mother	179	199.08	35635.00	12516.00	-3.604	.000**
	Child	179	159.92	28626.00			

As seen in Table 3, the results of Mann-Whitney U test, which was implemented to find out whether there was a statistically significant difference between the scores of Turkish Parent PARQ (Short Form) and Child PARQ: Mother (Short Form) sub-dimensions, revealed that the difference between the mean scores of warmth/affection sub-dimension (U=13436.50, p<.01) and the difference between the mean scores of control sub-dimension (U=12516.00, p<.01) were statistically significance.

These findings show that the children's perceptions of warmth, affection and control were less than the mothers' (high scores in the sub-dimension of warmth/affection mean that less affection is perceived).

Findings on the Achievement Motivation of Gifted Children

An analysis was made to determine the identified extrinsic motivation, unmotivation, intrinsic extrinsic motivation and intrinsic motivation levels of the children, and the n and Ss values of the scores they got from the SME sub-dimensions are given in Table 4.

Table 4.

Descriptive Statistics for Children's Scale of Motivation in Education Subscale Scores

		Scale of Motivation in Education			
	n	Lowest Score	Highest Score	$\bar{X}$	Ss
Identified External Motivation	229	3	15	14.06	1.82
Amotivation	229	3	15	4.56	2.39
Introjected External Motivation	229	3	15	4.14	1.99
Intrinsic Motivation	229	3	15	12.60	2.96

It is presented in Table 4 that the children's mean scores in the sub-dimension of identified external motivation was $\bar{X}$=14.06, of amotivation was $\bar{X}$=4.56, of introjected external motivation was $\bar{X}$=4.14 and of intrinsic motivation was $\bar{X}$=12.60. According to these findings, it can be said that the children's identified external motivation and intrinsic motivation were high and their amotivation and introjected external motivation were low.

Discussion

In this research, the mother-child relationship, the relationship of the children's perceptions of mother acceptance-rejection and control and their motivation were investigated and discussion and comments were presented about the results.

Gifted Children and Their Mothers' Acceptance-Rejection Perceptions and Their Control Levels

It was found in this research that both mothers and children perceive acceptance at high level, rejection at low level and control at mid-level in the mother-child relationships. In the literature, some research results that show the parents of gifted children report a democratic, supportive and positive relationship were reached (Ataman, 2008; Bourgeois, 2012; Uyaroğlu, 2011; White, 2009). Clark (2013) states that the parents of the children with high academic achievement care about their children and the mothers are responsible individuals. When the literature was reviewed, it was seen that there were studies in which it was determined that the number of the children who perceive high level mother acceptance and mid-level control was majority (Bakır, 2015) and the parents allow their children freedom while they are fulfilling their academic tasks (Bourgeois, 2012). There are also some studies which show that the relationships of the children with their parents were positive (White, 2009). It is believed that this finding of the research is important and useful for the gifted children to maintain their developments sturdily.

When the acceptance-rejection and control levels of the mothers and children which they perceive in the mother-child relationship were compared, it was seen that there was a significant difference in the warmth/affection and control sub-dimensions of Turkish Parent PARQ (Short Form), Child PARQ: Mother (Short Form). The difference in the sub-dimension of warmth/affection results from the fact that the children perceived less warmth and affection than their mothers reported and the difference in the sub-dimension of control results from the fact that the children perceived less control than their mothers reported. When the literature was reviewed, it was found that the mother acceptance level of the children were less than their mothers reported (Rohner et al. 2005) and the acceptance-rejection perceptions of children and their mothers were close to each other. In White's (2009) study, it was determined that the parents believed that they were mostly moderate and supportive to their children and the children perceived their parents as critical and intrusive although both the mothers and the children reported a positive relationship. This finding of the research shows that the children perceive less affection and control than their mothers report. PARTheory assumes that individuals' perceptions, interpretations or analyses are more effective in human behaviours than objective incidents. PARTheory places emphasis on warmth, hostility or apathy experiences that the child perceives in the cases in which the parents' and the children's perceptions of parent-child relationship are different from each other (Rohner, 2000, p.24-27).

Gifted Children's Motivation

In this research, it was found out that the identified external motivation and intrinsic motivation levels of the children were high and amotivation and introjected external motivation levels of the children were low. The literature review

provided us with some studies which reveal that gifted children are quite motivated as they display intrinsic and external motivations (Al-Dhamit and Kreishan, 2016), gifted children are compatible with intrinsic motivation (Skollingsberg, 2003), gifted children have high motivation levels towards science and technology lesson (Et, 2013). The children's having high level of both intrinsic motivation and identified external motivation can be considered as important characteristics for their academic lives.

Conclusion and Recommendations

This study has provided an insight about how the mother acceptance-rejection and control level are perceived by the mother and the child and they have with the children's achievement motivations.

As a result of the study, it was determined that mothers perceived their behaviors towards their children as highly accepting and they perceived their children's behaviors towards control as moderately controlling. Children, on the other hand, perceived their mothers as highly accepting and found their mothers' behaviors as moderately controlling. However, when the perceived acceptance-rejection and control levels of mothers and children were compared, children stated that they perceived less warmth/love from their mothers and perceived their mothers as less controlling. In summary, it has been determined that gifted children and their mothers have different perceptions of love and control in the mother-child relationship. This result gives an idea about the emotional characteristics of children. Examining the sources of difference can provide a basis for research on this subject in terms of the development of the child. Another finding of this study is that children have high levels of identified extrinsic motivation and intrinsic motivation; amotivation and introjected extrinsic motivation levels were determined to be low. This result is a positive feature for the academic life of gifted children. These results can form a basis for revealing the motivation differences in different sample groups (non-gifted) and examining the motivation sources in different samples.

Recommendations for Further Study

In this study, mother-child relationship and motivation levels of gifted children were examined. Differences can be revealed by conducting comparative research with different groups (non-gifted children, socio-economic level, etc.) on the subject. Studies that reveal the motivational elements of the mother-child relationship can be planned.

Recommendations for Applicants

Based on the results of this research, informative seminars can be given to school psychologists, teachers and families about gifted children's mother-child relationships, motivation levels and the effects of these characteristics on the socio-emotional structure of children.

Limitations of Study

Size of the sample and research method (the quantitative) might bring out some limitations. The mothers could not be reached directly. The interviews with the mothers and their children might have provided more information about the study. Mixed methods, the data obtained from other sources (evaluations in this study were only based on self-declaration) and longitudinal design can be considered for this kind of researches. This can present us more reliable and valid data.

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Research Article

Lecturers' perspectives on how physical spaces are used in higher education for talent development of students

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Abstract

This article details the findings of a study done at a Gauteng Higher Education Institution in South Africa. It's part of a bigger study called "The Dynamics of Higher Education Space and Place in Sub-Saharan Africa." The volunteers were chosen at random and were all freely available. The study's goal was to look at the perspectives and experiences of 17 lecturers. Lecturers were expected to match their exigence variables to their eventuality spaces. Interviews were employed to acquire data for this interpretive qualitative study. The participants' perspectives are discussed during the discussion. The selected institution is concerned about the lack of space at South African higher education institutions. One of the issues that exacerbate the poor academic performance of lecturers at the institution is space use in higher education settings. In order to alleviate the challenges of space, the research organization needed to use space and policy. There is pressure on higher education institutions and lecturers to deliver continuous improvement in systems and performances. The results of the investigation of lecturers' opinions about the way physical spaces are used in higher education for talent development of students showed that most of the lecturers, in addition to being overworked, faced various obstacles, such as insufficient resources and physical space, which are repeatedly mentioned in similar studies, and inadequate manpower support. Therefore, in this regard, the establishment of collaborative networks between lecturers and students, the dynamism of university administrators, especially the Chairs of Departments to support lecturers with adequate office space to support talented students is very important which is consistent with several studies. The identification of gifted students in the educational system should be based on accurate and scientific criteria. It is recommended that lecturers should be provided with adequate space (offices) in performing their official responsibilities.

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Introduction

This article reports on a study undertaken in the Gauteng Province of South Africa's Higher Education Institutions (HEI). It looked into lecturers' perceptions with the utilisation of physical space in higher education and how they relate to human resource management. Lecturers' ability to organize their work in a systematic manner might be influenced by space availability in their work stations. Many studies have found that lecturer performance is influenced by the amount of space. Martinez, Duarte, Cristina, & Garcia-Luna (2021) found that the optimal conditions of the interior environments must generate comfort and well-being for people, promoting a healthy lifestyle at work, school, and in leisure and entertainment areas. Society needs clean, safe and well-ventilated spaces that allow them to carry out their daily activities in an adequate way. This is why it is necessary to achieve a balance between spatial use and social standards. Looking at the photos below, space is used differently by different stakeholders.

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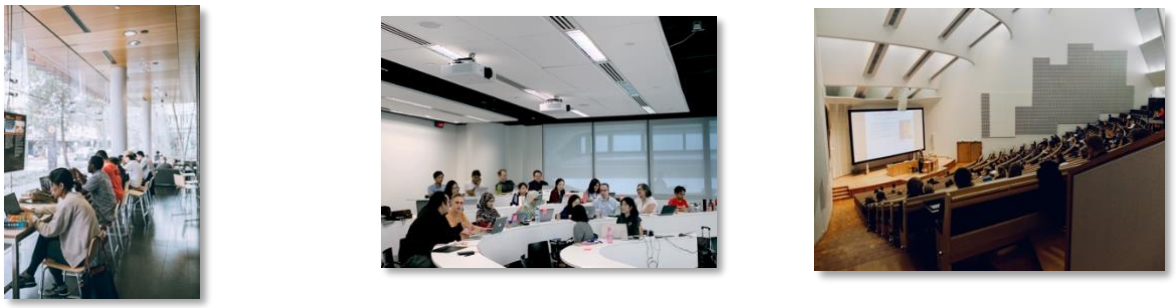

Photo 1

University Facilities-Spaces for Students (Source, 2022a, 2022b, 2022c)

On the other hand, Yu (2021) discovered that there is still a lack of data in higher education about the relationship between spatial design and pedagogical efficiency. In higher education, the landscape of learning environment design is undergoing a transition. Flexible, innovative learning spaces have sprung up all over the world in response to shifting viewpoints on how knowledge is discovered and what constitutes significant and suitable higher education in today's culture over the last decade. Affective and motivational aspects of student learning, such as 'learning motivation,' 'emotions,' and 'concentration effort,' can all be linked to space. This means that students and lecturers may have a reason or motives for performing or behaving in a certain way in a certain location, particularly when picking where to learn. The way students process their subject matter can be linked to their learning space. Lefebvre identified three areas, according to Nelson and Johnson (2021), which together comprise a socio-spatial trialectic. The familiar and expected are framed in the first "perceived space." The "ideals"-how "society should be"-make up the second "imagined space." The third "lived space" reflects the collision of the perceived and imagined as a result of social actors' in-action judgments, such as students and lecturers. "The space where lecturers can make decisions about the practices and ideologies of students they can interrupt and how they might do so in their own time and space," the lived space is a realm of imaginings and possibilities.

Theoretical Framework

Using Herzberg's theory, this study looked at lecturers' experiences with the use of physical space in higher education in relation to human resource management. Workplace discontent and satisfaction are influenced by factors such as working environment, recognition, the work itself, and interpersonal relationships and status (Ruthankoon & Ogunlana, 2003). Maksum (2021) discovered that inaccuracies in attitudes, beliefs, and human thinking about human needs influence the prevalence of materialistic lives, as well as deviant behaviour to meet wants that harm others and themselves. According to McAdam, Miller, & McSorley (2019) organizational efficiency can be achieved by matching organizational attributes to events that indicate the organization's state. The term "organizational features" will be used in this work to refer to the issue of space. These researchers discovered that shared circumstances, such as space, can have an impact on lecturers' performance in higher education. Lecturers were expected to match their exigence variables to their eventuality spaces. Herzberg's theory, which was first proposed in 1968, emphasizes the role of self-needs and motivational requirements in the development of self-potential (Amin et al. 2021). The level to which motivation is accepted and the extent to which self-needs are addressed are the two key aspects that this theory states can influence a lecturer's job contentment. The motivator and hygiene factors, according to this idea, are the aspects that shape job happiness. While hygienic variables will be referred to as external factors in this study, such as working circumstances, connections with colleagues will influence happiness in lecturers' job. According to this view, higher education must offer lecturers room to do their jobs, be fair to them, and provide them the freedom to act in order for them to be content with their work. As a result, this theory should be employed as a foundation for safeguarding the well-being of lecturers in higher education (Amin et al. 2021).

Literature Review

Talent Development of Students

Many practices in higher education are geared toward ensuring that students master an articulated set of grade-level content area skills (e.g., standards, competencies) each academic year, according to Lockhart, Meyer, & Crutchfield (2021). Gifted and talented education should function as a pathway for students to move beyond grade-level mastery to appropriately challenging instruction and pacing that meet their individual academic needs in higher education, but many practices in higher education are geared toward ensuring that students master an articulated Universities must distinguish between gifts and talents to enhance students' learning. Gifts are innate abilities (e.g., intellectual, creative, social), whereas talents are domain-specific abilities that must be cultivated over time (e.g., engagement in a domain,

targeted skill development, progress monitoring). Teachers, programs (e.g., specialized classes, coaching, mentorship), and systems (e.g., university) must all play a role in developing those abilities into talents. Gifted education policy should concentrate on giving guidelines for advanced academic programming and recommending instructional strategies for learners who have showed the ability to function at a high level. However, the plans must always include enough rules for colleges to develop a cohesive gifted and talented education program. In support of Lockhart, Meyer, & Crutchfield (2021), differentiated instruction (DI), as identified by Stollman, Meirink, Westenberg, & Van Driel (2021), can be used to foster talent in higher education (DI). DI is an educational strategy that can be utilized to challenge each student to further develop their talents and abilities while also considering the students' unique learning needs. Lecturers may have difficulty adopting DI due to a variety of spatial constraints, including big class sizes, physical classroom arrangements, and a predefined curriculum. Lecturers should not be required to follow a predefined curriculum in talent classes, and they should be encouraged to differentiate their lectures to further develop students' abilities. Lecturers should be encouraged to use their knowledge of adapting instruction to the student's learning profile, which includes the student's preferred learning mode, environment, emotions, interactions, physical needs, intelligence preference (analytical, practical, creative), gender, culture, and other factors.

On the other hand, Martinez, Duarte, Cristina, & Garcia-Luna (2021) found that spatial manifestations that express the physical and environmental characteristics in a living space, regardless of the use of the space and its occupants," as well as user comfort factors, "conditions outside the environment that influence its appreciation," should be incorporated into good habitable university spatial design.

Universities, according to Tryus and Herasymenko (2020), are actively seeking new educational approaches, shapes, technologies, and techniques, the use of which will allow higher education to reorient itself to meet the most pressing social, economic, and educational spatial needs while also incorporating numerous innovative, theoretical, and new teaching methods. Many affluent countries have recently begun to aggressively utilize the dual model of higher education instruction. The dual education model is defined as a paradigm in which the entire teaching process is divided into two parts: teaching is arranged in the space of the educational institution, and at times, teaching is done in the space of e-learning via the use of ICT (Information Communication Technology). Higher education institutions should expand their support for talent development education, according to Li and Liu (2021). The core of their extensible teaching mode must be their talent training objectives. Aimed at the needs of talent training, the extensible teaching mode extends the teaching in various aspects of teaching content, teaching forms, teaching methods, teaching time, and teaching space, thereby broadening students' knowledge scope and channels for acquiring knowledge, optimizing their learning methods, cultivating good learning habits, and exerting their personhood. Understanding the relationship between space and higher education space is crucial to comprehending lecturers' experiences in higher education. Professional labour, according to Biesta (2017), must be distinguished from other types of employment since it is focused with the improvement of human well-being. This suggests that professionalism is more than just a technical trait; it also has a normative component. Unlike many other occupations, lecturer job necessitates highly specialized knowledge and abilities, which is one of the reasons why they require adequate workspace in higher education institutions. Lecturers' work should be distinguished from other types of work since they operate in authority and trust relationships. Even while digital tools may promote accessibility in education, ableist dynamics and 'disabling' beliefs may influence and silhouette the settings in which teaching, and learning take place, according to Fernandez (2021).

In this study, the term "disablism" is defined as "a collection of ideas and behaviours that promote differentiated treatment of lecturers due to real or assumed spatial problems." Accessibility may be harmed by venues imbued with the ideology of 'disablism,' as these places are inclined to exclude lecturers whose physiques and intellectual functioning deviate from general 'norms.' Madikizela-Madiya (2018) discovered that university personnel and management have a "trust gap." The experiences of lecturers in this article revealed skepticism when they stated that they were sharing office space with contract employees. Lecturers' lived experiences of the conceptualized and experienced features of space in higher education make up the representation of space. According to Black, Dhaliwal, Stanton, & Hutchinson (2014), the quality of physical learning settings has been demonstrated to have a significant and measurable impact on student accomplishment, productivity, contentment, and well-being in higher education. The characteristics of physical space have a direct impact on psychological, mental, and physical health. Distracted behaviour, difficulty to focus, impatience, physical pain, higher stress levels, and raised blood pressure can all come from a badly planned space. Well-designed rooms, on the other hand, can have a favourable impact on mood, creativity, social connectivity, and learning. In a higher education context, a welcoming physical environment is critical for student well-being and overall success.

Gourlay (2021) discovered that space is important because it is possible that the current Covid-19 crisis, and the ensuing shift to home working space and digitally-mediated teaching and learning space, has resulted in a situation in which the importance of physical location and bodily practices has faded. There is no need for lecturers to dress in a 'professional' manner, arrive on campus on time, find a specific office space, set up computer equipment, wait for students to arrive and settle down, then address them verbally while physically facing them, adhering to the social, material, and linguistic conventions that define 'teaching.' All of these needs are eliminated or significantly altered in terms of spatial configuration. In contrast, the concept of the 'virtual' is rife with ideas of non-materiality and disembodiment. Therefore, the absence of spatial interaction with students caused by the Covid-19 pandemic diverted lecturers' ideas on concerns motivating them, according to Cicha, Rizun, Rutecka, Strzelecki (2021).

The level of lecturer-student contact had deteriorated. Lecturers needed to adapt how they communicated with students in order to counsel and assist them in the virtual world, which was especially noticeable prior to the pandemic's onset. Working remotely posed a problem for universitiess in terms of maintaining high academic standards and maintaining the integrity of the educational process. Similarly, Kryvylova et al. (2021) discovered that a comfortable teaching and learning atmosphere encourages students' and lecturers' drive for self-realization, creativity, success, and introspection. Likewise, Coman & Tîru (2020), discovered that managing and developing internet infrastructure in order to avoid interruptions, especially during video-conferences; using friendly tools that help students assimilate and understand information; providing reliable, interactive, and diverse electronic resources; and using social networks to build online communities for students in order to optimize learning during spatial challenges like those created by the Coronavirus pandemic.

Meeting the unique needs of gifted students can be difficult due to a variety of spatial and pragmatic factors: universities may not have enough space to accommodate all students, and lecturers may lack adequate training to meet those needs; identification strategies may not align with university programming; and students of colour and low-income students are often much less likely to be identified for services, or, even if identified, to benefit from them (Plucker & Barber, 2021). Openness, according to Kokko and Laura Hirsto (2021), can provide for a variety of possibilities for the utilization of physical space. However, openness alone will not make the space useful; however, new meanings can be given to the physical space through lecturer negotiations. As a result, the rooms can acquire a fledgling level of adaptability for various disciplines. Some lecturers, for example, can make better use of space in higher education by breaking students into smaller groups and dividing physical space to make it more conducive for student groups. Lecturers may be able to use a variety of pedagogies as a result of the space split. Physical space can take on connotations relating to lecturers' perspectives on students' particular learning or their own unique teaching styles in certain instances. In turn, meanings can be given to physical spaces related to lecturers' professional learning in cases when teachers designed the physical spaces so that "all students are together in one vast and open place."

Problem of Study

This research objective is to determine the lecturers' experiences with the utilisation of physical space in higher education in relation to human resources management. The way space is used in higher education institutions is a source of worry. 'What are lecturers' experiences with the use of physical space in higher education in connection to human resources management?' was the question investigated in this article. Profession gratification is a happy or encouraging emotive state that arises from an optimistic appraisal of one's occupation or work experience (Thant & Chang, 2021).

Method

Research Model

Interviews and materials (articles)were used in this qualitative investigation. The subjects were chosen at random and were easily accessible to the researcher. The study's goals were to look at the perspectives and experiences of 17 lecturers. The participants' statements were translated and interpreted to study qualitative data from the interviews. The goal was to highlight how lecturers interacted with their physical environments.

Participants

The participant lecturers were chosen at random and asked to participate in the study. The study's goal was to find out how 17 lecturers felt about the utilisation of physical space in settings in higher education. The information was collected using interviews.

Research Instruments

The interview schedule consisted of 15 interview questions (see Appendix) and the paper reports on the lecturers' responses to the following question:

- What are your experiences of the physical spaces within the institution?
- What are your experiences of technology within the institution?
- Who controls the utilization (and maintenance) of the physical and technological spaces?
- What is your role in ensuring that the physical spaces are enabling?
- Who do you think contributes to the constraints of the physical and technological spaces?
- What should be done to attend to the constraining factors about the physical and technological spaces? Who should do this?
- What should be done to enhance the enabling spaces? Who should do this?
- In your view, how do the physical and technological spaces relate to where the university is located?

Data Analysis

A tape recorder was used to record the statements of the participant lecturers, and their statements were transcribed verbatim. The statements were then analyzed using the interpretive paradigm to get insight into the lecturers' experiences of physical space in their work environments. Themes developed from the comments of lecturers as participants during the analysis of the recording of their responses, which are explained in the discussion section.

Procedure

The study was conceptualised in 2018 and it is ongoing. The paper was compiled at the University of South Africa. This is an empirical paper that was compiled from a bigger study called 'The dynamics of higher education space and place in Sub-Saharan Africa'. The participant universities are University of South Africa, University of Zululand, University of Zambia, Walter Sisulu University, Makerere University, University of Fort Hare, and the Vaal University of Technology. The paper used a qualitative technique, interviews and an interpretive paradigm.

Results and Discussion

Lecturers are not openly protesting since they believe it is their responsibility to ensure that they provide what is expected of them according to their employment contracts. They claimed they were sharing office space with other academics on fixed-term contracts, and they expressed their dissatisfaction. The lecturers who were interviewed did not express any public dissatisfaction since they explained that their responsibility was to guarantee that they delivered what was required of them according to their employment contracts. These instructors believed that the institution could not provide them with everything they needed. As a result, they needed to learn how to grow as individuals. The institution has policies in place that they needed, but their implementation was inadequate. Lecturers' experiences with the physical surroundings at the institution where they work are, according to them, inconvenient. They expressed dissatisfaction with having to share office space with other teachers on fixed-term contracts. They were dissatisfied that the contracted professor's contract would expire in two or three months, and they would have to adjust to a new lecturer joining the school. As a result, the lecturers believed they were being inconvenienced by the use of their physical spaces. They also stated that sharing the institutional environment had an emotional impact on them. The lecturers are not publicly complaining since they believe their responsibility is to ensure that they perform what is expected of them according to their employment contract. In truth, what is going on in the institution discourages lecturers, because what they need is a space that they can use. When interviewed, the instructors stated that they do not have an appropriate environment in which to carry out their jobs. When the speaker participants talked about technological spaces, they were referring to technology. The management of the use of physical and technological spaces was supervised by Information Communication Technology (ICT) senior people at the university, according to the interviewed academics. The lecturers believe that social components are crucial for their long-term survival in the institution. According to the lecturers, they are approaching the difficulties of space from many perspectives. They thought that their answers are influenced by their interactions with many factors, and that they must cope with those factors. Because they had faced numerous obstacles in the institution over the issue of space.

Lecturers are expected to comply with university physical space policy and they must demonstrate their skills and abilities, according to the policies in place at the institution. The availability and utilization of lecture hall space was an issue. When it came to the topic of space in a higher education institution, the lecturers felt that space was where they worked. When lecturers continue to use their offices, there is a lack of space. Because of the issue of resources, lecturers' experiences are that they are using one resource in this researched institution of higher learning, office space caused lecturers to bother one another. They discovered that on one floor, a machine, such as a copying machine, was heavily used by a large number of individuals, and that, in the end, they believed it was costly to the institution because so many people were using it. The photocopy machine was always breaking down in their experience. The lecturers' general impressions were that the issue of space was a difficulty because they were unfamiliar with the balancing of

the number of persons in the building. Patricia and Asoba (2021) discovered that lecturers who are pleased with their careers are probable to do well, resulting in high performance and efficient service, which could boost the company's production.

They claimed that some of the lecturers were unreasonable, and that their demands were too much for some of them to bear. Some instructors had encountered the physical space based on the technological space within the university; however, some of the technological equipment is out of reach because if they need to print one copy, they must travel from one office to another, which is time consuming. Moving from one level of the building to the next to complete everything wastes a lot of time for the lecturers, and they miss out on doing anything critical to improve their performance. According to the lecturers' experiences, the higher education learning institution where they work restricts their use of physical space. According to lecturers, the usage of a single piece of equipment by a large number of people has a straight or unintended influence on the institution. Physical spaces, because some of the lecturers did not have an office when they were hired at the college. Some described how they used to have to report to the administrator's office until they were told to go to the library and report there. They wanted to be able to access the internet, and they eventually got some offices to work in. Physical space was not working for some of the participant lecturers because they were unable to do anything related to their academic work.

Physical and Technological Spaces in the Institution

They viewed technological spaces as the method in which the institution's computer system and related tools are programmed to assist them. The lecturers, if given the chance to grade the technical area in which they find themselves, would give it a rating of less than a 5. These lecturers claimed that whenever they had to deal with the institution's technology, they would frequently experience issues with connectivity and access to computer systems and related tools. The technological space, for them, was a major stumbling block to the efficient use of their areas. The physical campus was closed, libraries were closed, and face-to-face contact was reduced, including in student dorms and the college cafeteria. Academic and social parts of student life have been shifted online, with the majority of interactions taking place on screens and in the 'cloud' (Eringfeld, 2021).

When it comes to the technological space, the professors are familiar with the abbreviation ICT. However, they were unaware of the usage of physical space. The instructors would not refer to a specific person as the weakest link in ICT, but whenever they asked assistance from those working in the ICT department, there was an element of employees who grumbled about their appointment contracts more than anything else. The lecturers noticed that the contracted workers felt they couldn't accomplish more than what they could with the resources they had. They were alluding to the fixed-term employee contracts here.

The lecturers believe that the institution's physical planners never planned ahead, and that if they had, the issue of space would not have arisen. According to their observations, the institution's planners appear to have failed to anticipate the issue of space. The lecturers feel that when the number of students at an institution grows, the institution's resources will need to grow as well. They proposed that the learner-to-space ratio should be matched with the amount of room available to accommodate all of the staff engaged. The lecturers recommended that the institution's management ensure that the institution's space was balanced at the end of the day. According to their observations, there were numerous imbalances in terms of space utilization. The lecturers feel that in order to deal with the issues of space, they must ensure that everything that is now there is in place, and that they manage the space to meet the demands of everyone in the institution. As lecturers, their job is to make sure that everyone has the resources and space they need to work. The physical and technological space, as it was, was very easy for the lecturers to reorganize to suit the institutional space. According to the lecturers, the location of the institution where the research was done was fine, but the setting was not appropriate for delivering high-quality programs to students due to space constraints. The lecturers care about their students and want them to be self-sufficient. Due to a lack of space, lecturers are unable to generate autonomous learners, thus they should review their programs to improve their students' academic performance.

Some of the participating lecturers had negative experiences since they were given laptops that they were unable to use successfully at times, especially when it came to their subject. These laptops were not assisting them in maximizing their work. Nonetheless, several of the participant instructors were overjoyed since they were given laptops. They have access to technology, but they would want to believe that employees on campus would need to be trained. The physical areas are governed by the Chairs of Departments and top officials in particular departments. It was up to them to decide, because there were persons appointed who had applied for positions but were unaware that they would be arriving, only to discover that there were no computers to hand to these newly appointed lecturers when they arrived. Some of the instructors' responsibilities included going to other departments to boost their

technological abilities. It's just that they couldn't get access to the information they needed to help them grow. Some of the participant lecturers discovered that there was a lack of sufficient training in terms of technological expertise at various levels inside the school. These lecturers had some room that they couldn't use, which was inconvenient for them. The lecturers feel that the school should implement control methods to address the issues of physical and technical spaces. They also believe that quality management methods should be employed.

Social Relations in the Institution as an Enabler of Growth of Lecturers

The social relationship between the lecturers They are able to grow as academics because they have all of the individuals around them aiding them in their development. As a result, regardless of the problems posed by the institution's physical constraints, professors desire to grow regardless of their circumstances. Lecturers believe that social relations have their own limitations since, even if they are busy growing themselves, they cannot obtain everything from the institution; some things they must learn in order to develop themselves. Some participants and lecturers claim that the social component of space has little bearing on their development. Because, at the end of the day, they are aware of space issues and ensure that societal influences have no bearing on their development. They make certain that, at the end of the day, those social variables will not interfere with their development as people and as a group.

To the lecturers, the institution's culture is about sharing space, regardless of the policy or norms that the institution has implemented, since if they do not share, some of the people will be unable to work. The lecturers' main responsibilities were to make sure that the material was passed on to the persons in charge of running the institution. As colleagues in some departments, lecturers were grumbling about the ICT system, which was failing them in their tasks at the college. Some managers, it was claimed, were scared to complain directly to the ICT department, so they hid behind the lecturers, urging them to raise their complaints to the ICT department's top brass. These lecturers are having special problems with ICT, and one of their responsibilities was to escalate their concerns to the ICT department. To be effective, each educational approach must meet certain criteria, such as lecturer expertise and student preparation. Thus, in the utilisation of space, the first step should be to assess the students' and lecturers' capacities, goals, and skills, as well as their moral reasoning and dynamics in terms of leadership, roles, and conflict resolution (Chiva-Bartoll & Fernández-Rio, 2021).

Policies and Rules as Enablers in Physical Space

The participant lecturers discovered that the institution has policies that they require, but that these policies are not being implemented as a people. Their expectations are that the policies should help them manage space within the institution. The reason for this statement is because these academics believe that if the institution can implement a space policy, they will be able to follow the rules and regulations to minimize the issues of physical space as lecturers. According to the lecturers' experiences, certain persons at the institution do not follow the space policy, which impedes their personal development in some way. They simply go about their business, regardless of space rules. Because some of them rebel and reject the existing space policy, their development is hampered. Students with characteristics of a typical application-directed learning pattern preferred flexible, innovative learning spaces; students with characteristics of a reproductive learning pattern considered traditional, didactic learning spaces as desirable or necessary; and students who adopted more strategies of a meaning-directed learning pattern placed less emphasis on the importance of space as they tended to choose different types of learning spaces (Yu, Vermunt, & Burke, 2021).

Roles and Policies Accommodate Multiplicity that is Simultaneity of Strengths or Abilities Within the Institution

Hill et al. (2021) found that in order to be effective in developing talent in working toward a shared vision, fostering inclusive partnerships, nurturing relationships through dialogue and reflection where power is shared equally, accepting partnership as a process with uncertain outcomes, and enacting partnership for transformation should all be guiding principles for good practice. All of these elements should be linked to emotions in order to go beyond logic. Emotions can influence how profoundly and critically students and lecturers engage with concepts and experiences, as well as the goals and incentives that limit or empower their actions.

Lecturers must multiply, and they must demonstrate their skills and abilities, according to the policies in place at the institution. That is, if they demonstrate their talents and abilities, they will be able to overcome the difficulty of space. To them, the solution will be to engage, all of them, in a discussion about the issue of space and how to address it. The lecturers question themselves how they can solve the physical space problem in their comments, because the issue at the university is how they can address the challenge they are facing. They acknowledged that they are confronted with a problem related to physical space, and that they must handle it regardless of the obstacles. The lecturers would not identify who was responsible for what, but they would stress that everyone needed to do

something to help with the space issue. For example, if the institution was aware that freshly appointed lecturers were on their way, it would make every effort to acquire physical space for them to use. Their hopes were that the institution's physical and technological area would be user-friendly for the newly hired lecturers. They also anticipated the institution to train them on how to use the advanced tools employed at the research facility. They expected to be taught how to use podcasts as well as all of the other tools and programs that the Open Distance e-Learning institution offered. The lecturer participants believe that the physical space should be preserved as enabling environments for them. Individuals in their own spaces should be accountable for the preservation of the institutional spaces, according to the participants.

Some of the participants were unsure how the physical and institutional spaces intertwined because, in an Open Distance e-Learning environment, they frequently interact with people they can't see. As a result, they believe that policies and rules for both professors and students should be in place and followed. As a result, given physical and technological spaces as a dimension, the instructors would want to collaborate despite their numerous disparities. Some of the instructors at the university are enthusiastic about teaching, while others are enthusiastic about project management. They desired and still desire their own space, and if given the opportunity, they would advertise the institution as widely as possible. The instructor participants stated that the institution's social relationships can help them grow. They also stated that any professor could seek assistance from any other colleague in the department, outside of their department, or in any other faculty. So, in that way, their interpersonal skills were enhanced, and they were able to find mentors and mentees from other departments, allowing them to occupy institutional spaces. The social ties in the institution, according to the participant lecturers' experiences, have an impact on their career growth. These lecturers discovered that social relations influenced them at times because they had innovative ideas that they wanted to put into action but were unable to do so because the ground or those in authority (or those who needed authority) did not allow them to implement and exercise their innovative creativity.

They faced insecurity from the authorities as well as a lack of vision for the institution's future. According to them, one of the issues that should be considered for the institution's long-term viability is the transfer of talents from people with competence and experience to those who are less experienced. The university must ensure that academics have access to space where they can use their knowledge and cooperate. The institution's space constraints varied depending on the conditions of individual instructors. However, in some situations, the institution is encouraged to assign lecturers based on their areas of expertise in order for them to cope with the physical and technological hurdles. Given the institution's regulations and norms, the participant lecturers' experiences revealed that the institution's culture is such that those in positions of responsibility do not adhere to policy execution in terms of space. The university had policies in place, and the lecturers believed that their function would be to be strategic and knowledgeable about those policies. Nonetheless, the lecturers would like to believe that it was due to a culture among certain of the institution's policy implementors. In general, the institution's culture is such that, while policies exist, they are not correctly and adequately applied. Lecturers discovered that various institutional policies and rules can help them enhance their performance and advance in their careers. These regulations and rules, they claim, are very clear and direct them on what to do, when to do it, and how to apply for advancement at the institution. Because of the spatial challenges at the school, even if lecturers have multitasking skills, space affects their performance in the location they find themselves in. The lecturers believe that the institutional rules and procedures allow them to be who they want to be in the academic environment. They (lecturers) can determine what they want to achieve and where they want to go in their careers because the school has an open policy.

Fostering Creativity in Classrooms

This paper explicitly acknowledges possible environmental and intrapersonal factors (i.e., environmental and intrapersonal catalysts) that may positively or negatively influence the development of both ability and achievement and gives recognition and status to highly able individuals who do not always translate their abilities into corresponding achievements (Jung, Jackson, Townend, & McGregor, 2022, p.149). Talent management, according to Rahiminia, Shahram, and Yazdani (2021, p.269), can lead to individual and organizational excellence as the greatest degree of performance in universities. They also suggested that university courses and environments should not obstruct students' ability to develop and bloom their abilities and creativity. The identification of gifted students in the educational system should be based on accurate and scientific criteria.

In comparison to other students, a gifted student must be recognized as someone who possesses abilities that are out of the norm (Fuhre, Øygard, & Sæther, 2022, p.3). Many scholars and educators, according to Wells and Plucker (2022, p.108), neglect the possibility to improve outcomes. Mo (2022, p.5), on the other hand, discovered that in order to stimulate creativity in students, lecturers must consider environmental modifications that may affect the

communication and exchange of new ideas. They must also respond with inventive and creative solutions to emerging environmental and competitive challenges. The demand for innovation with social value grows as civilization progresses. To promote "creative" students, the academic community must change the curriculum. A good lecturer should deliver more than the discipline's acknowledged content, which is advantageous to the students' growth of creativity. A skilled lecturer may push students to venture outside of their comfort zones and challenge their assumptions and understanding of the world by using presentations and various classroom activities to introduce new ideas, concepts, and theories. Students will not create unless they are well-motivated by their lecturers and given adequate time to do so (Mo, 2022, pp.5-6).

Universal screening, according to Olszewski-Kubilius and Subotnik (2022, p.110), is a procedure that can assist all children, not just those designated gifted. Universal screening is useful for discovering high-potential individuals who are typically missed by traditional identification protocols. Universal screening, according to one of the most important studies on the subject, will only be helpful at determining potential if it is supplemented with wide cutoffs or local standards. What works for extremely young children who have not yet had extensive subject area experience, for example, may not work for kids with disabilities or gifted students. Olszewski-Kubilius and Subotnik (2022, p.110) discovered that study has proved the efficacy of employing local rather than national standards to identify students that require a more advanced curriculum than what is offered in their schools. Using local norms, particularly at the school level, can help to extend and diversify the children who receive services, but it will also necessitate new program models, especially if the institution also serves students who already meet established gifted identification standards. The caveat that this study would want to emphasize here is that the purpose of using local norms should be to create programs that help students develop skills and knowledge so that they can satisfy national standards for advanced middle and secondary school courses.

When gifted education is viewed as aptitude development with periodic evaluations and modifications, each student can thrive while keeping a learning trajectory that is unique to them. Specialists should oversee keeping this aim in mind for children who accomplish proficiency targets and aiding teachers in planning curriculum that exceeds grade-level norms. If the enormous variety of individual variances in complex aptitudes and qualities could be properly detected and treated in a tailored learning system, the future of gifted education may be merged into general education (Lakin & Wai, 2022, p.96).

Conclusion

"What are lecturers' experiences with the utilisation of physical spaces in higher education in connection to human resources management?" was the topic of this paper. Regarding the issue of space, lecturers felt that there was a significant difficulty with space at the university because they were sharing space. The difficulty is exacerbated by lecturers sharing space. There should be a commission that assigns space to lecturers. The instructor participants stated that the institution's social relationships could help them advance in their careers. Lecturers discovered that some of the institutional regulations and rules in place can help them enhance their performance and advance their careers. Because the institution is an Open Distance e-Learning setting, many of the lecturers were interacting with persons they couldn't see, some of the participants were unsure how the physical and institutional places interacted. The lecturers who were interviewed expressed no public dissatisfaction, explaining that it was their obligation to ensure that they provided what was expected of them under their employment contracts. These professors feared that the university would be unable to supply them with all they required. As a result, they had to learn how to develop as people. The institution has policies in place that are needed, but they are not being implemented properly. In their experience, the photocopy machine was always breaking down. Because they were unfamiliar with the balance of the number of people in the building, the lecturers' general opinions were that the issue of space was a challenge.

Lecturers feel that social relations have their own restrictions since they cannot receive everything from the institution, even if they are busy expanding themselves; some things they must learn to develop themselves. Some participants and lecturers believe that the social aspect of space has little impact on their growth. It was reported that some managers were afraid to complain directly to the ICT department, so they hid behind lecturers, asking them to take their grievances to the ICT department's top brass. These instructors are having specific ICT issues, and one of their jobs was to bring their concerns to the ICT department's attention. Each educational strategy must meet specific characteristics to be effective, such as lecturer expertise and student preparation. Certain individuals at the school, according to the lecturers' experiences, do not adhere to the space policy, which impedes their personal growth in some way. They simply go about their business, oblivious to the limitations of space. Their progress is impeded because some of them rebel and reject the prevailing space strategy. In their comments, the lecturers ask themselves

how they will tackle the physical space problem, because the issue at the university is how they will confront the obstacle they face. They admitted that they are dealing with a physical space issue, which they must address regardless of the hurdles. The lecturers would not say who oversaw what, but they would emphasize that everyone needed to contribute to the space problem. Lecturers noticed that social relationships influenced them at times because they had new ideas that they wanted to apply but were unable to do so because the ground or people in power (or those who required authority) would not allow them to do so. Generally, the lecturer participants admitted that the problem of physical space utilisation in higher education must be addressed regardless of the hurdles.

Recommendations

The study recommends that there is need to utilise space and policies effectively by providing lecturers with enough space to work in. The university should provide space which is welcoming. Space challenges for staff to be communicate with each other and their chairs of departments. Problems and issues expressed in the opinions of the lecturers should be addressed through professional communication. Employees indicated strong dissatisfaction and they were unhappy with physical policy and administration, technical and interpersonal, and working conditions. It is recommended in dealing with a physical space issue in higher education, it should be address regardless of the hurdles.

Limitations of the Study

The study offers a snapshot of only the lecturers' experiences with space utilization, and while broad generalizations cannot be drawn from the small sample size, it is likely that the findings are reflective of trends in South African Higher Education Institutions. The investigation in this study is limited to a single institution of higher learning.

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Appendix 1.

Semi-structured Interview Questions

Semi-structured Interview Questions

Q1. What are your experiences of the physical spaces within the institution?
Q2. What are your experiences of technology within the institution?
Q3. Who controls the utilization (and maintenance) of the physical and technological spaces?
Q4. What is your role in ensuring that the physical spaces are enabling?
Q5. Who do you think contributes to the constraints of the physical and technological spaces?
Q6. What should be done to attend to the constraining factors about the physical and technological spaces? Who should do this?
Q7. What should be done to enhance the enabling spaces? Who should do this?
Q8. In your view, how do the physical and technological spaces relate to where the university is located?
Q9. What are you passionate about as an administrator?
Q10. How do the social relations at the institution enable the growth of this passion? Or your development as an administrator?
Q11. How do social relations in the institution constrain your development as an administrator?
Q12. What would you attribute to the cause of these enabling (and/or constraining) social factors?
Q13. How might the enabling factors be enhanced or consolidated for sustainability?
Q14. How do XXXX policies and rules enable your development?
Q15. How do they constrain your development?

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Research Article

Education for sustainable development-based lesson plan validity test for mastery of pre-service science teacher learning outcomes

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Abstract

Higher education has the responsibility to be a source of development and implementation of education for sustainable development, which is a global issue. This modality can be operationalized through a lesson plan. Education for a sustainable development-based lesson plan is a plan that utilizes project-based learning as part of active learning recommendations for college students. Updating lesson plans is an activity that pre-service teachers must carry out to ensure professionalism that follows the development of science. This study aims to test the validity and reliability of experts and users of updating lesson plans for mastery of learning outcomes, collecting data using documentation and questionnaires on three experts and 40 pre-service science teachers. Validation test using Gregory formula for validity and Cronbach-Alpha for Reliability. The results of the validity assessment are categorized as high validity. The level of agreement reliability between experts and users generates no significant differences in the learning outcome instrument. The development of this lesson plan resulted in 39 items out of 42 items. The reliability of the learning outcomes assessment instrument for pre-service science teacher reached the reliable criteria. Education for a sustainable development-based lesson plan becomes a recommendation to produce a varied and comprehensive lesson plan for natural science learning in schools.

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Introduction

Sustainable development is a planned effort that combines several aspects, namely social, economic, and environmental aspects, into a development strategy to maintain the integrity of natural resources, environmental sustainability, safety, welfare, and quality of life for present and future generations. Sustainable Development (SD) is an international issue that the United Nations have officially raised since 1987 (Glavic, 2020). To realize the 2030 sustainable development agenda, the United Nations has formulated 17 sustainable development goals (SDGs). These goals are grouped into three main aspects: social goals, economic goals, and environmental goals. One of the 17 sustainable development goals is to ensure that people worldwide receive quality education that is inclusive, equitable, and accessible throughout life. These goals are then integrated into a new idea: education for sustainable development (ESD). ESD is an effort to grow students' knowledge, skills, values, and attitudes (Zguir et al. 2021). They can face global issues and challenges that are interrelated, such as issues of climate change, welfare, environmental damage, inequality, and so on.

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ESD aims to produce individuals who can evaluate and reflect on their actions by considering the impacts that will be caused in economic, social, and environmental aspects in the present and the future. As part of society, an individual must act by considering the principle of sustainability and participating in moving his community towards sustainable development (CebriÃ¡n et al. 2020). ESD integrates learning objectives, content, pedagogy and learning environment, and social transformation into a quality education system that supports SDG creation (Glavic, 2020).

Research on ESD has become a topic of great interest. It is being developed in terms of exploring, implementing, and evaluating innovative pedagogical approaches or curriculum development to promote ESD competence (CebriÃ¡n et al. 2020). ESD can be included in the curriculum at all levels (Purnamasari & Hanifah, 2021). ESD can be integrated into learning in various ways, such as through learning tools, media, and learning models. The ESD educational process can be more directed, systematic, and measurable so that, in the end, there will be awareness and understanding of environmental boundaries, attitudes, views, and behaviors towards environmental management (Emilzoli, 2021).

One of the objectives of learning science is understanding the natural environment and natural resources that need to be protected and preserved. So it is hoped that after studying science, students can contribute actively to environmental conservation efforts (Purnamasari & Hanifah, 2021). This research is certainly in line with sustainable development goals, especially environmental aspects. In this case, there is a link between education for sustainable development (ESD) and science learning. ESD can be integrated into science learning. The integration by raising the issue of sustainable development in all aspects and equipping students with various ESD competencies such as knowledge, skills, values, and attitudes competencies expected to assist students in taking an action that supports sustainable development. The observations show that there is good preparedness for prospective science teachers in developing ESD-based science learning. They have an understanding of ESD (78.9%) and teacher readiness in lesson planning (77.3%) (Erlina, 2020).

An efficient learning process must be planned carefully in advance. The quality of learning will be significantly influenced by the quality of the lesson plans used (Anggraeni & Akbar, 2018). The learning process will be more organized through careful planning so that learning planning is a step that should not be missed before the teacher carries out learning activities (Emiliasari & Jubaedah, 2019). A lesson plan is a list that contains what the teacher must do at a particular time for a specific group of students regarding a specific lesson. Lesson plans help teachers move from one stage of learning to the next smoothly and keep students focused and encouraged to concentrate on each step of the lesson (Ali Bin-Hady & Abdulsafi, 2018).

UNESCO (2017) suggests that a pedagogical approach that fits the characteristics of ESD is learner-centered, action-oriented, and transformative learning. ESD focuses on motivating and empowering students to become community members who can think critically and participate in shaping a sustainable future. In education for sustainable development, this type of encouraging competence through active learning is more recommended. Participatory learning methods can empower students' character to take action in the context of sustainable development. The selection of a learning method must be adapted to the needs of students, learning environment, and available resources, support, facilities (Huang, 2020).

The learner-centered learning approach emphasizes the active development of knowledge rather than just transferring information. Students' initial understanding becomes the starting point to stimulate the learning process and build their knowledge (Ashwin, 2020). The role of educators in learner-centered learning is as a facilitator, not just transferring structured knowledge. Action-oriented learning engages students in action and reflects their experiences into the learning process and personal development. This learning enhances knowledge acquisition, competency development, and value clarification by linking abstract concepts to the learner's personal and life experiences. The role of educators in it is to create a learning environment that encourages student experience and intuitive thinking processes (UNESCO, 2017).

Project-based learning (PjBL) is learner-centered learning based on constructivism and constructionism theories (Aldabbus, 2018). PjBL equips students with content knowledge and develops psychomotor skills and social skills of students, such as seeking information through various sources, solving problems, critical thinking, self-evaluating, summarizing, and presenting. The advantages of this model are attractive to practitioners and prospective practitioners, which can be seen from the response that the readiness of future teachers in implementing project-based learning reaches 78.2% (Erlina, 2020). Project-based learning focuses on real-world issues and problems. Students have responsibility for their learning process. The role of the teacher here is only as a guide, mentor, motivator, facilitator (Jalinus et al. 2017). This characteristic of project-based learning is suitable for integration with education for sustainable development, which recommends a learner-centered and action-oriented learning approach (Bramwell-Lalor et al. 2020). Thus, implementing project-based learning models in universities is a recommendation to support

prospective teachers in designing ESD-based learning plans. This characteristic of project-based learning is suitable for integration with education for sustainable development, which recommends a learner-centered and action-oriented learning approach (Bramwell-Lalor et al. 2020). Thus, implementing project-based learning models in universities is a recommendation to support prospective teachers in designing ESD-based learning plans.

Problem of Study

Some of the problems that underlie this research are that prospective science teachers have limited experience applying ESD in science learning, developing creative science learning plans are still low, and involving PjBL in science learning (Erlina, 2020). Some of these limitations are relevant to previous research, which states that ESD is a challenge, a lack of ESD in universities, and ESD and universities cannot integrate ESD into their curricula (Habib et al. 2021; Maiorescu et al. 2020). One source of challenges to PjBL is limited knowledge as a major reason for difficulties encountered and low confidence in implementing PjBL (Du & Chaaban, 2020; Vembriyanto & Murniarti, 2021).The final stage of the learning process is assessment. Project-based assessment of learning outcomes has a weakness, namely an unfair assessment (Lin et al. 2021). This study focuses on testing the validity and reliability of education-based learning plans for sustainable development. The trial was carried out using the Project-based learning model on prospective science teachers. The formulation of the problem raised in this study are:

- What components of an education-based learning plan for sustainable development for mastery of pre-service science teacher learning outcomes?
- What are the points of the knowledge domain evaluation instrument in the education-based learning plan for sustainable development for mastery of pre-service science teacher learning outcomes?
- What are the points of the skill domain evaluation instrument in the education-based learning plan for sustainable development for mastery of pre-service science teacher learning outcomes?
- What are the points of the attitude domain evaluation instrument in the education-based learning plan for sustainable development for mastery of pre-service science teacher learning outcomes?
- How to validate education-based learning plans for sustainable development for pre-service science teacher learning outcomes?
- How is the reliability of education-based learning plans for sustainable development for mastery of pre-service science teacher learning outcomes?

The long-term goal of this research is to find the right lesson plan in education for sustainable development for mastery of pre-service science teacher learning outcomes. The specific target/short-term goal to be obtained in this research is to develop a valid and reliable ESD-based learning plan for mastering the learning outcomes of prospective science teachers.

Method

Research Model

This research is instrument development research. The focus of the instrument is on the study of the lesson plan. The lesson plan developed is an education for sustainable development (ESD) based learning plan using a project-based learning model in the Science course of the School of Science Education study program. The adaptation of the instrument development stages (Divayana et al. 2020) can be seen in Figure 1.

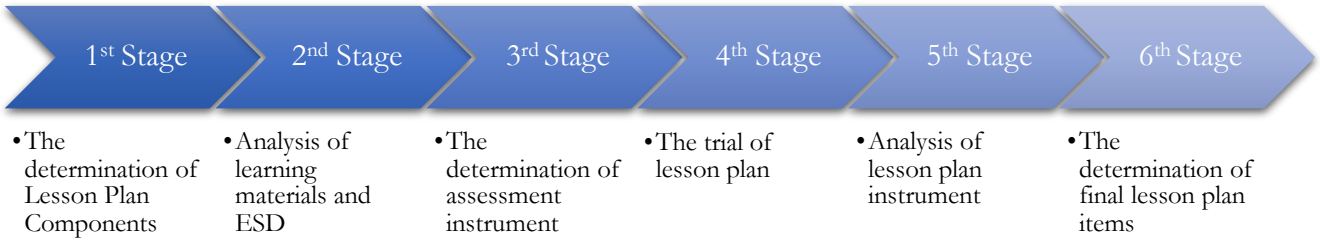

Figure 1

Stages of Developing a Science Learning Plan Based on Education for Sustainable Development

In the first stage, the components of the lesson plan and what tools will be developed are determined. The second stage is the analysis of school science materials and sustainable development issues related to these materials. The issues raised are not only environmental issues but also social and economic issues related to science material. This stage mapped the problems faced by the community, and the solutions can be made in terms of science. In stage 3,

the selection of assessment instruments on aspects of students' knowledge, skills, and attitudes is carried out. The instrument used is self-assessment and peers. In stage 4, the lesson plan was tested to get an expert's assessment of the quality of the lesson plan. In stage 5, the lesson plan analysis is carried out to ensure that the lesson plan is valid and reliable. Stage 6 is carried out to determine the final item ready to be used in the field as a guide for carrying out lectures.

Participants

The participants involved in the content validity test of the instrument were three experts in the field of science education. The trial to support the reliability test of the instrument was 40 pre-service science teachers. The trial was conducted on pre-service science teachers who had learned to use the project-based learning model.

Research Objects and Locations

The object of this research is a set of learning plans for school science courses based on Education for Sustainable Development (ESD). The learning device uses a project-based learning model to master the learning outcomes of pre-service science teachers. The location of this research was carried out in a university located in the province of North Bali.

Data Collection Instruments

The instrument used to obtain data in this study can be in the form of a questionnaire consisting of the lesson plan items developed. In addition to the questionnaire, documentation in the form of photos of the testing process carried out by experts and photos of the lecture process are used as authentic evidence that shows the research process has been carried out.

Data Analysis

The validity of the learning plan in this study was analyzed using content validity techniques through expert testing using the Pearson product-moment correlation formula. The learning plan reliability test in this study used Cronbach's Alpha coefficient because the instrument used was a non-test instrument that used a Likert scale. The categorization of the validity and reliability refers to the Guilford classification, which can be seen in Table 1.

Table 1

Classification of Instrument Validity and Reliability Scores

Validity Category	Reliability Category	Score
Very high	Very high	$.80< r_{xy}\leq 1.00$
Tall	Tall	$.60< r_{xy}\leq .80$
High enough	High enough	$.40< r_{xy}\leq .60$
Low	Low	$.20< r_{xy}\leq .40$
Very low	Very low	$.00< r_{xy}\leq .20$
Invalid	Invalid	$r_{xy}\leq .00$

Results and Discussion

Based on the existing problems and the research methods used to solve these problems, several research results need to be presented and discussed in more depth. The results of this study include several things as follows.

Lesson Plan Components

Learning Media; The learning tools developed are lecture syllabus, lecture contracts, semester lecture plans, material summaries, scenarios, project assignment instruments, and student assessment instruments. The syllabus is a set of plans regarding materials, activities, and learning management and a form of assessment of learning outcomes for each course. In the guideline for developing Undiksha 2016 curriculum learning tools, it is stated that the syllabus at least contains:

a. identity of courses: name, code, credit-weights, prerequisite courses
b. description of the course
c. learning outcomes
d. outline of the learning plan regarding the main learning materials and learning outcome indicators.

Semester lecture plan describes the course syllabus developed by the lecturers independently or together in the expertise group in science and technology in the study program. Following the learning process standards of the National Higher Education Standards, the semester lecture plan shall at least contain a. the name of the study program, the name and code of the course, semester, credits, the name of the supporting lecturer; b. graduate learning outcomes

charged to courses; c. planned final capabilities at each learning stage to meet graduate learning outcomes; d. study materials related to the capabilities to be achieved; e. learning methods; f. the time provided to achieve the ability at each stage of learning; g. the student learning experience is embodied in the tasks that students must do for one semester, criteria, indicators, assessment weights, and a list of references used.

Lecture contracts are key points (summaries) whose scientific content is transferred from the semester lecture plan that individual lecturers and scientific groups have prepared, but technical and normative matters agree with lecturers and students. this lecture contract is given to students and then used as a reference in attending lectures. the lecture contract contains the following points: a. subject identity; b. course description; c. learning outcomes; d. learning methods; e. reading material; f. duties/obligations; g. assessment criteria; h. class schedule.

The summary of the material contains a brief and clear explanation of Sustainable Development and Education for Sustainable Development. In the summary of the material developed, an example of the integration of Education for sustainable development into learning in the form of a concept map that connects issues of sustainable development problems with science material is also provided and how to solve these problems based on scientific studies of science.

In order to make the semester lecture plans easier for lecturers to use, learning scenarios were also developed. This scenario contains instructions that will be carried out by lecturers and activities carried out by students in each phase of project-based learning. In the scenario, time estimates are also given for each learning phase so that lecturers can use lecture time efficiently.

The model used in the lecture is a project-based learning model so that the student assignment instrument is a project-based task. The intended project is for students to analyze school science material and ESD issues, then put them into a mind map. PjBL stages in learning tools (George, 2007; Keser & Karahoca, 2010). namely, phase 1: start with the big question; phase 2: design a plan for the project; phase 3: create a schedule; phase 4: monitor the students, and the progress of the project; phase 5: assess the outcome and phase 6: evaluate the experience. Assessment instrument developed internal judgment (self-assessment) and external judgment (assessment of group friends). on learning outcomes of knowledge, skills, and attitudes. The development of this instrument supports the reliability of peer assessment that can correct the lack of learning outcomes in PjBL implementation. Team members can observe the interactions and contributions of other teams in collaborative projects (Lin et al. 2021).

Science and ESD Material Analysis

Education is one of the most important media to achieve sustainable development, so there is a need for education for sustainable development in the curriculum, namely education that can grow students' knowledge, skills, values, and attitudes in supporting sustainable development. The importance of ESD in sustainable development issues can be described as follows.

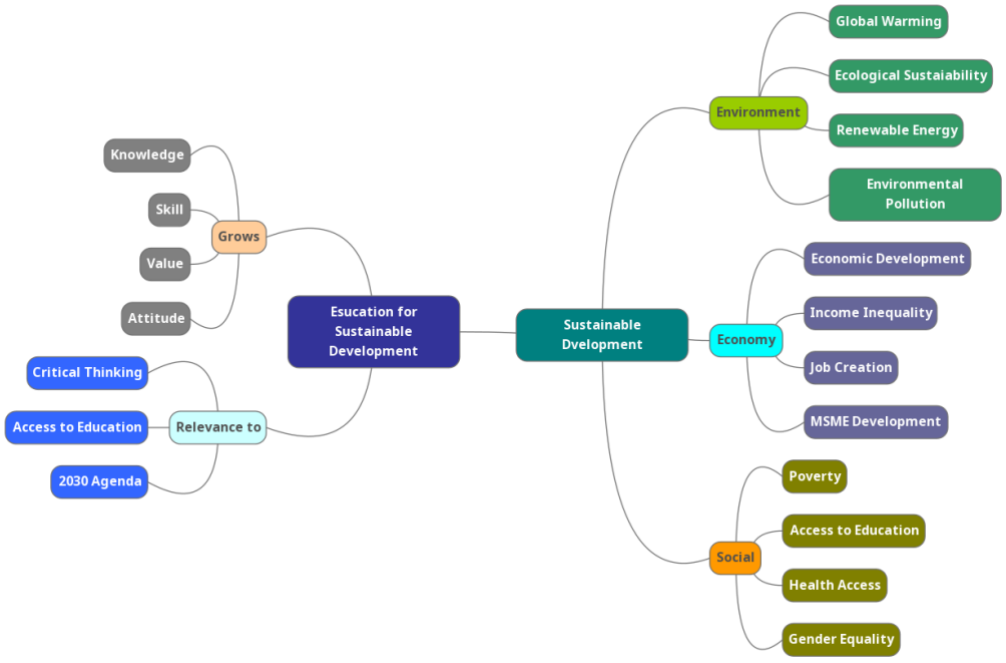

Figure 2

The Link between Sustainable Development and Education for Sustainable Development (Glavic, 2020; UNESCO, 2017)

The school science course discusses the science material taught at the junior high school level. Social, economic, and environmental issues promoted in sustainable development cannot be separated from the scope of natural and social sciences. In science material, there are several topics such as energy, ecosystems, environmental pollution, global warming, sustainability of life, and environmentally friendly technology. There are several appropriate topics in the realm of Social or Social Studies, namely the potential of Indonesia's natural resources, social interactions that include social conflict and plurality, and income redistribution. ESD can integrate science learning with social science learning to achieve sustainable development goals.

Project Evaluation Items

Assessment on project assignments is an authentic assessment carried out by lecturers at each stage of project-based learning, namely the preparation stage, implementation stage, and reporting stage. Project appraisal points are presented in Table 2.

Table 2

Project Assessment Instruments

No	Aspect	Statement item
1	Preparation	Students make schedules and group workflows systematically Students make a mind map design plan clearly and on target Students prepare the complete mind map making tools and materials
2	Implementation	Students carry out activities according to their respective assignments Students carry out group activities independently Students collect data and information through trusted sources Students are able to identify related science materials and Sustainable Development issues Students are able to analyze solutions to problems related to sustainable development in accordance with the study of science material
3	Reporting (Product/Mind Map)	Mind map according to the plan that has been made Mind map is attractively designed Mind maps contain short and clear words The flow in the mind map is clear and easy to understand The material is in accordance with the school's science study The environmental issues raised are related to the study of the material The social issues raised are related to the study of the material The economic issues raised are related to the study of the material The solutions presented are in accordance with the study of the material The solutions presented can solve the problem The presented actions allow to be applied
4	Reporting (Written Report)	Report writing in accordance with systematics Report writing according to improved spelling The contents of the report are clear and easy to understand Science material explained in a detailed and weighty report ESD materials described in detailed and weighted reports There is an explanation of the relationship between science material and every Sustainable Development issue raised
5	Reporting (Presentation)	Students deliver presentations clearly and communicatively Students deliver presentations according to the allotted time The presentation view represents the entire contents of the report Short and clear presentation view Attractive presentation view Students understand the content of the presentation well Students are able to explain the relationship between science material and the issue of sustainable development raised Students are able to answer questions related to the presentation presented
6	Reporting (Video)	The picture in the video looks clear Audio is heard clearly The duration of the video according to the requested time allocation

(Adapted from the Education Assessment Center Team, 2019)

The items for assessing the learning outcomes of prospective science teachers are adapted from the reference achievement indicators for the school's science study subject. This course applies to the bachelor's science education study program.

Knowledge Domain Assessment Items

The assessment of the realm of knowledge is carried out through self-assessment and friends. The points of the statements submitted are presented in Table 3.

Table 3

Knowledge Assessment Instruments

No	Aspect	Statement item
1	Develop correct scientific terms/concepts	I compiled a mind mapping project using scientific concepts correctly
		I develop a mind mapping project by fulfilling all parts of the ESD value, sector, issue, solution, action

Skill Domain Assessment Items

The evaluation of the skill domain is carried out through self-assessment and assessment of friends in groups. Skills assessment instruments are divided into general skills assessment instruments and specific skills assessment instruments. The developed instrument contains statement items related to the skills possessed by students after learning activities. The points of the statements submitted are presented in Table 4 and Table 5.

Table 4

General Skills Assessment Instruments

No	Aspect	Statement item
1	Able to apply logical, critical, systematic, and innovative thinking in the development of Science.	I compiled a mind map of ESD-based Science material that has component linkages based on logical thinking
		I developed a mind mapping of ESD-based Science material critically based on the issues.
		I compiled a systematic mind mapping of ESD-based Science materials based on ESD values, sectors, issues, solutions, actions
		I developed a mind mapping of innovative ESD-based Science materials based on solution and action components.
2	Able to study the implications of the development or implementation of science and technology that pays attention to and applies scientific values following expertise based on scientific principles, procedures, and ethics.	I compiled a mind map of ESD-based Science material on solution components based on clear references
		I compiled a mind mapping of ESD-based Science material on the action component based on the latest findings with reference sources less than the last 10 years
3	Able to make appropriate decisions in the context of problem solving based on the results of information and data analysis through the presentation of solution actions.	I compiled a mind map of ESD-based Science material on the action component based on clear references
		I compiled a mind map of ESD-based Science material on the action component based on the latest findings with reference sources less than the last 10 years.

Table 5

Special Skills Assessment Instruments

No	Aspect	Statement item
1	Able to apply his understanding in the field of school science to solve problems and be able to adapt to the situation at hand	I am able to develop an ESD-based learning plan that has value in supporting environmental sustainability through a comprehensive mind mapping of science material
		I am able to develop an ESD-based learning plan that is valuable in supporting economic sustainability through a comprehensive mind mapping of science material
		I am able to develop an ESD-based learning plan that is valuable in supporting social sustainability through mind mapping of science material comprehensively

Attitude Domain Assessment Items

Evaluation of the attitude domain is carried out through self-assessment and assessment of friends in the group. The developed instrument contains statement items related to the scientific and professional attitudes of students who grow during the learning activities. The points of the statements submitted are presented in Table 6.

Table 6

Attitude Assessment Instruments

No	Aspect	Statement item
1	Contribute to quality improvement and self-quality by complementing each other through interaction in group activities.	I'm taking lessons
		I compile a plan for making a Mind Mapping Project based on the format.
		I carry out activities according to the role
		I do self-evaluation
		I prepare a Mind Mapping Project report in writing
		I compiling a Mind Mapping Project report in the form of a video.
2	Appreciate the opinions/ideas and original findings of others	I agree with the group friends' answers to fill in the mind mapping according to their respective roles before conducting group discussions
		The results of my work were approved by my group friends to be included in the mind mapping according to my role before conducting group discussions.
3	Have sincerity, commitment, and sincerity in work.	I do mind mapping according to the number of tasks in the group
		I do mind mapping assignments according to the objectives of each task
4	Demonstrate the ability to cooperate and have social sensitivity to society and the environment	I organize group collaboration activities
		I have a discussion with the group to evaluate and perfect the mind mapping that has been prepared by each group member
5	Demonstrate a disciplined and responsible attitude in doing the task	I collect assignments in groups on time as planned
		I collect assignments in groups on time as planned
6	Internalizing academic values, norms, and ethics	I compile reports according to assigned components
		I compile reports according to standard Indonesian sentences
		I compiled a mind map based on clear reference sources.
7	Internalizing the values of Tri Hita Karana	I pray before and after study and be grateful
		I have group discussions in a polite and respectful manner
		I compiled a mind mapping task by raising issues about environmental problems
8	Internalize the spirit of independence through self-evaluation based on group work	I did a self-evaluation fulfilling all aspects
		I did an honest self-evaluation.

Education for Sustainable Development-based Lesson Plan Trial

There are two forms of testing carried out on this learning plan to obtain the validity and reliability of the instrument, namely the test of the validity of the content of the lesson plan and the test of the instrument's reliability. The content validity test involved three experts (education experts), while the instrument reliability test involved 40 respondents (pre-service teacher). Complete data on the validity of the lesson plan can be seen in Table 7, while the data on the reliability test results can be seen in Table 9.

Table 7

Validation Test Results by Experts

Validator 1		**Validator 2**		**Validator 3**	
Less relevant (1-2)	Relevant (3-5)	Less relevant (1-2)	Relevant (3-5)	Less relevant (1-2)	Relevant (3-5)
12, 36, 41	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42	28	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42	12	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42

The results of the validity of the three experts are then summarized in the form of 3x3 tabulated data so that it is easier to calculate content validity. The content validity 3x3 tabulated data by three experts is shown in table 8.

Table 8

3x3 Tabulation Validity Test Results

Validator		V3	
V1	V2	Less relevant (1-2)	Relevant (3-5)
Less relevant (1-2)	Less relevant (1-2)	-	28
	Relevant (3-5)	12	41
Relevant (3-5)	Less relevant (1-2)	-	-
	Relevant (3-5)	-	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42

From the tabulated data, then the validity of the lesson plan is calculated using the Gregory formula. The process of calculating validity using the Gregory formula can be carried out using the reference data in Table 8. The process of calculating validity can be explained in full as follows.

After calculating the validity of the instrument, then calculating the reliability of the learning plan instrument. The results of the reliability calculation are shown in Table 9.

Table 9

Reliability Test Results

	Item-Total Statistics				Reliability Statistics	
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
V_1	8.36	.869	.771	.86	.890	3
V_2	8.31	.853	.827	.806		
V_3	8.29	1.038	.775	.861		
A_1	34.25	4.397	.000	.656	.661	13
A_2	34.33	3.917	.258	.637		
A_3	34.30	4.164	.205	.644		
A_4	34.30	3.908	.505	.615		
A_5	34.40	3.579	.320	.628		
A_6	34.38	4.189	.070	.663		
A_7	34.30	4.010	.383	.627		
A_8	34.28	4.102	.422	.631		
K	34.43	3.738	.267	.637		
G_1	34.40	4.092	.119	.658		
G_2	34.50	3.436	.392	.611		
G_3	34.50	3.436	.392	.611		
S	34.65	3.156	.487	.588		

Description:

V_1: Validator 1; V_2: Validator 2; V_3: Validator 3

A_1: Attitude 1; A_2: Attitude 2; A_3: Attitude 3; A_4: Attitude 4; A_5: Attitude 5; A_6: Attitude 6; A_7: Attitude 7; A_8: Attitude 8; K: Knowledge; G_1: General Skills 1; G_2: General Skills 2; G_3: General Skills 3; S: Specific Skills

Learning Plan Analysis

The validity test by the expert was carried out on 42 items of the learning plan instrument consisting of 23 items of construct assessment and 19 items of content assessment. The validity test results show that three items are less relevant and 39 items are relevant. In the construction assessment of the semester lecture plan, one of the items considered relevant by all validators was item number 11, namely a statement regarding the comprehensiveness of the indicators and classified according to the domain/domain of attitudes, knowledge, skills that got a score of 4 from each validator. The indicators follow the learning outcomes of study programs based on graduates' vision, mission, and profile. Another relevant item in assessing lecture contract content is item number 29 regarding whether the use of synchronous and asynchronous methods supports learning achievement. During lectures, face-to-face, online using an online meeting platform and asynchronous self-study to complete projects according to individual assignments in groups. Then in the assessment of semester lecture plan content, several items that are considered relevant are items number 32, 33, 36, and 37, respectively, regarding the suitability of learning outcomes with ESD, suitability of the sequence of learning phases, up to date learning media, and rubrics and assessment criteria support authentic assessment. Learning uses the mindmap 2.0 application, which is up to date and supports peer review assessment to get the learning outcomes of prospective science teachers. Self-assessment acts as internal judgment, and peer review assessment as external judgment. In the assessment of project assignment content, items regarding the suitability of written and video report guidelines and learning objectives received a score of 5 out of two validators and 4 out of one validator.

However, the validator considers several items less relevant, namely items number 12, 28, and 41. Item number 12 is an assessment of the construct of the semester lecture plan regarding the suitability of the time allocation with the scenario that gets a score of 2 from two validators. Lectures were carried out for three meetings and were less effective because model students were involved as supporting resource persons. Item number 28 is an assessment of the content of the lecture contract regarding learning resources or materials that can support learning achievement. The summary of the material as supporting learning resources is considered less comprehensive with learning outcomes. The learning process requires science teaching materials integrated with ESD, so that prospective teachers have a clear conceptual understanding. Another item that is considered less relevant is item number 41 regarding the project assignment guide, which is sequentially following the achievements of each phase of the PjBL model. The item is considered less relevant because there are doubts in the preparation of the planning in the table of activities that need to come first. The table is the activity design table or group collaboration activity table.

Based on the calculation of content validity, the result is .929. So it can be said that the overall learning plan instrument is included in the very valid category. However, based on the results of the expert's assessment, three items are declared less relevant, so they must be removed from the instrument or corrected so that they become relevant. The results of the reliability test obtained Cronbach's Alpha value of .661. This value supports the reliability of the assessment instrument on the learning outcomes of prospective science teachers in the form of knowledge, skills, and attitudes. Each item shows reliable results. The lowest Cronbach's Alpha is item S. Item S can improve the editorial score of the assessment item.

Final Lesson Plan

The final result of the learning plan instrument is determined based on the results of the instrument's content validity. Items declared relevant in the validity test by the expert will still be used, while items declared irrelevant will be discarded or corrected so that the item becomes relevant. Based on the validity test results in table 8, 39 items are used without improvement because they are declared relevant, and three items are used with improvements because they are declared irrelevant. The lesson plans developed can be applied in learning ESD-based School Science courses. Learning is carried out using a project-based learning model. Students are given project assignments in mind maps that can map science material and related ESD issues, along with solutions and actions that can overcome the problems raised. Concept maps are an excellent medium to assess students' ability to relate the concept of sustainable development. However, the concept maps are better used as group evaluations, not individual evaluations (Svanström et al., 2018).

The assessments used in the lesson plans developed are authentic in project assessments, self-assessments, and peer assessments. Authentic assessment is a significantly meaningful measurement of student learning outcomes for attitudes, skills, and knowledge. The term authentic is genuine, accurate, valid, or reliable. Conceptually, authentic assessment is significantly more meaningful than standardized multiple-choice tests (Wildan, 2017). Teachers can use authentic assessment results to plan other activity programs such as remedial, enrichment, or counseling services (Ristanto & Djamahar, 2019). Project appraisal is an activity of assessing group project assignments in mindmaps, reports, and presentations in the form of videos that must be completed within a particular time. In project appraisal, the assessed aspects are aspects of planning, implementation, and reporting (Educational Assessment Center Team, 2019).

A student's learning and achievement depend on the teacher's effectiveness (Nousheen et al. 2020). In schools, teachers are one of the main determining factors in improving the quality of education. The process must be designed in such a way as to produce learning outcomes that are as desired (Wibowo & Farnisa, 2018). Therefore, science teachers as mediators and facilitators in science learning in junior high schools are one of the determining factors for the success of ESD (Erlina, 2021). The role of a teacher as a facilitator means to provide services so that students can easily accept and understand the subject matter. So that later the learning process will be more effective and efficient (Yestiano & Zahwa, 2020).

Conclusion and Recommendation

The development of a learning plan based on education for sustainable development produces several components, namely lecture syllabus, lecture contracts, semester lecture plans, material summaries, learning scenarios, and learning assignment and assessment instruments. Learning assessment instruments are categorized into knowledge, skills, and attitudes assessment instruments. The development of this lesson plan resulted in 42 items validated by three experts. After the validation process and content validation analysis were carried out, 39 items were declared relevant, and three items were declared irrelevant so that improvements were needed. However, in general, the validity test states that the lesson plans developed are included in the very valid category. The reliability test was carried out on 40 students, which was then analyzed and resulted that the lesson plans developed were included in the reliable category. So that, in general, the learning plans developed can be used for learning activities in School Science courses based on Education for Sustainable Development. However, there are still some obstacles in the implementation of learning trials using the developed learning plans. Education for a sustainable development-based lesson plan becomes a recommendation to produce a varied and comprehensive lesson plan for natural science learning in schools.

Limitations of Study

The author suggests several important attributes for future studies so that research on development becomes comprehensive. The learning activities carried out in this study used a project based learning model through online learning in the School Science course. There are still other types and models of learning that can be used to develop

students' potential in ESD. It is hoped that further research can investigate the integration of ESD into other courses with the latest approaches more fully.

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Research Article

The culturally valued domains in talent studies in Iran: experts views

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Abstract

Talent and giftedness is one of the cultural concepts to identify a person who is eminent in one or numerous domains that society highly regards. So, finding the culturally valued domains in talent studies is a priority, and this has led to the development of measures used in gifted assessment and educational programs in each society. This study aimed to investigate the culturally valued domains in Iran. In this regard, fourteen interviews with educational and psychological experts were carried out. Purposive and snowballing samplings were used, and the participants took part in an unstructured interview. An unstructured interview is an interview with a comprehensive and open question in which the interviewee can lead the conversation. Usually, in an unstructured interview, the interviewer listens and reflects more than speaks. In this study, the experts were asked to describe their idea regards the culturally valued domains in Iran. For analysing data, open, axial, and selective codings of grounded theory were used. Finally, eleven culturally valued domains for identifying talented and gifted students were introduced by the experts. These domains included: Logical and Mathematical, Science(Academic), Artistic, Leadership, Literacy, Technology, Spatial, Athletic, Social Relationship, Existential, Spiritual and religious and Entrepreneur. This research suggests that these domains should be considered for use in Iran in talent and giftedness studies. Identifying talented students in Iran, which is an Islamic country and culturally different from westerns countries, also considering developmental and educational programs for the identified students could play a significant role in talented studies literature. Furthermore, researching culturally valued domains in other Islamic countries is highly recommended.

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Introduction

Talent refers to the possession and use of untrained natural ability in at least one ability domain (Gagné, 2004). Talent Developmental Models have been introduced based on the determination of gifted and talented students across talent domains. The ability domain is one of the crucial factors in Talent Developmental Models (VanTassel-Baska, 2021). For instance, a differentiated model of giftedness and talent (DMGT), introduced by Gange (2000), refers to six natural ability domains: intellectual gifts, creative gifts, social gifts, perceptual gifts, muscular gifts and motor control gifts.

Pfeiffer (2012) has proposed his model of the tripartite model of giftedness by seeing giftedness through the lens of high intelligence, outstanding accomplishment, and potential to excel. Based on this theory, he made the Gifted rating scale (GRS) by introducing six subscales: intellectual, academic, artistic, creativity, leadership and motivation. One of the other most popular models of giftedness is Renzulli's three-ring model (Renzulli, 1984, 2009). He considers

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two types of giftedness: schoolhouse and creative, productive giftedness. The Scales for Rating the Behavioural Characteristics of Superior Students (SRBCSS) was developed in this regard with fourteen subscales: Learning, Reading, Leadership, Science, Dramatics, Creativity, Motivation, Artistic, Musical, Communication (Precision), Communication (Expressiveness), Planning, Mathematics and Technology characteristics.

Perleth, Sierwald, & Heller (1993) also refer to intellectual ability, creativity, social competence, artistic ability, and psychomotor ability in the Munich Longitudinal Study of Giftedness model. On the other hand, the role of culturally valued domains has been emphasised in talent developmental models. Renzulli (1984, 2009), in his Three-Ring Conception of Giftedness model, emphasised producing creative things in culturally valued domains. Also, Pfeiffer has claimed that "giftedness is a culture-bound conceptualization, not something real in nature" (Nicpon & Pfeiffer, 2011; Pfeiffer, 2002). Sternberg (1985) has mentioned that cultural forces will influence domains of the abilities in talented studies. Cross and Cross (2020) have suggested a school-based definition of giftedness by concentrating on the various domains of giftedness that the educational system search for and recognises. Subotnik et al. (2011) have also introduced the "megamodel" in which they have mentioned giftedness shows society's values.

The concept of talent and giftedness is applied in each society as a label to identify the person who is doing excellence in one or several domains that society highly regards (Pfeiffer, 2015). For instance, what is considered as talent and giftedness in industrial culture differs from the talent and giftedness definition in hunting and agricultural societies (Pfeiffer, 2015). In other words, one individual may be considered talented in one society, while in different communities, maybe not. So, it is needed to identify the culturally valued domains in talent search and identification. The list of domains is indefinite, but society's values and culture can limit it (Pfeiffer, 2015). The discussed models introduced in Western countries, but they also were applied in East countries. In other words, Most Asian countries use Western rating scales in talent studies regardless of cultural differences. For instance, the Gifted Rating Scale (GRS) of Pfiffer and Jarosewich (2003), which introduced in the United States, was applied in China (Li et al. 2008), Korea (Lee & Pfeiffer, 2006), and Oman (Hassan Hemdan, et al. 2017). Although the acceptable reliability and validity of GRS were reported in these countries, it can be because of some shared ability domains. Hence, some abilities that may play a substantial role in these countries may be neglected by GRS.

The investigation of talented and giftedness research publications in recent years demonstrates a Western bias in giftedness studies. 84% of research were conducted in Western countries, 10% in East Asia, 4% in Islamic countries and 2 % in South East Asia and India (Pfeiffer et al. 2018). What is more, only a few cross-cultural studies can be found in talent and giftedness literature, while talent and Giftedness are cultural concepts, and cultural diversities needed to be considered in these kinds of studies (Phillipson, 2020). Culture and Society play a crucial role in identifying talented students. For instance, GRS tried to cover the six domains that have been introduced by the Ministry of Education (1994) in the United States based on United States society. These domains included: general intellectual ability, specific academic attitude, creative or productive thinking, leadership ability, music, visual and performance arts, and psychomotor abilities. Public Law 91-23g, Section 806, states" the Commissioner of Education shall define "gifted and talented" for purposes of Federal education programa"(Marland, 1971).

Remarkably, the role of culture and society will be seen in identifying talented girls when the culture and society do not let them show their performance and talents (Bernal, 2001; Castellano & Frazier, 2021). For instance, in Islamic countries, some talented girls who are good at rhythm, melody, and media communication will not be recognised as talented. In other words, because of the cultural conditions and some religious values, the females will not have the opportunity to develop their performance and be recognised as talented in these types of art. So, the artistic ability in the western version of the giftedness scale, such as GRS, is not as much useable as spiritual talent in religious cultures. Nevertheless, in most Asian countries such as some Arab countries, GRS is being used in identifying talented students. Culture-sensitive researchers and advocates of giftedness and gifted studies in Asian societies are concern about applying the western scale in these countries without considering a cultural grounding. In other words, they are concern about imposing western values in gifted education. Previous studies of talent and giftedness have not dealt extensively with talent studies' cultural views. Only cross-cultural research has been conducted, in which the Western talent models and scales were applied in different cultures such as Eastern cultures. While, there might be some talent domains exclusively related to one culture, which the western scales might not measure. For instance, a society where hunting is valuable might develop skills and talents in the hunting domain (Pfeiffer, 2015), as talents are influenced by the environment (Heller et al. 2013). Hence, a scale that the other society has made might not be suitable to be used in a hunting society. In Southeastern Asian countries, Buddhist, Hindu, and Islamic religious values assume significant importance, so they should be considered in giftedness and talented studies (Chan, 2018). Hence, this study investigated the culturally valued domains in Iran, a religious country.

Method

Reserch Model

This study used grounded theory to collect, analyse, and interpret data (McCann, & Polacsek, 2021). Grounded theory starts with individual cases, experiences, incidents and develops conceptual categories to understand and explaining data. Grounded theory methods help the researchers to apply qualitative research proficiently in structuring data collection and analysis (Charmaz & Thornberg, 2020).

Participants and Sampling

The sample included 14 Iranian educational and psychological experts. Seven of them were National Organization for Development of Exceptional Talents (NODET) members, who were executors of identifying and guiding talented students, four were eminent psychologists in giftedness, and exceptional children and three were the experts of the Iran's National Elites Foundation (INEF). The experts' age ranged from 40 to 73 years, and the majority were male (n = 71.42%). Academically, four of the experts were professors, and the rest had at least a PhD degree in Education and Psychology. Years of the experts' experiences in the talent and giftedness field was from 10 to 50 years. The participants were selected to attend an unstructured interview by applying purposive and snowballing sampling. All interviews were recorded by an encrypted electronic device. The experts individually were asked to choose a suitable place for the interview. The experts were told that the interview time would be between 15 and 45 minutes. The participants took part in individual face-to-face interviews with consent.

Data Collection and Analysis

The project's purpose was explained to the experts, and data collection started with an open-ended question. The experts were asked to explain the "The Culturally Valued Domains in Talent studies in Iranian culture?" Interviews were audiotaped and transcribed. One of the experts who was a member of the NODET asked to do one more interview with him. He wanted to share some more information regarding giftedness and talented students. Open, axial, and selective coding were used for analysing data (Williams & Moser, 2019). Open coding is the line-by-line coding of the text by breaking up the text into discrete parts, which is substantial in the first phase of research and data collection. Axial coding is grouping the initial codes based on a pattern in developing categories (Bitsch, 2005). Thematic or selective coding, combines the related categories and subcategories to make a central concept (Corbin & Strauss, 2014).

Rigor

Multiple approaches to raise rigor were considered. For instance, regarding originality, categories that caused new viewpoints based on present literature were investigated (Charmaz, 2014). Memoing also was conducted after each data analysis session. Memo-writing is the stage between coding and the first draft of the completed analysis (Charmaz & Belgrave, 2007). Data analysis was conducted with a research team included experienced grounded theory methodologist. Member checking (Bowen, 2009) was also done, in which the experts verified that the culturally valued categories found as talent domains in Iran were compatible with their experience.

Results

The terms, concepts, and phrases that the participants stated regards the research question were extracted after transcribing the interviews. The researchers used "open coding" of grounded theory to conceptualise the terms and the concepts that the experts had mentioned. In each set of open codes, the common concepts were extracted as the axial codes. At the final level of coding data, a single category emerged from the organised Axial categories (Table 1).

Table 1
Selective, Axial, Open Categories and An Example

Selective	Axial	Open	Example
Logical and Mathematical	Logical-Analytical thinking, Mathematic ability	Analytical ability, Logical Ability, Problem Solving, Cognitive Ability, Measuring Ability, Numeric ability, Understanding the shapes	*"Mathematics is one of the crucial domains in talent studies with broad fields. For instance, Mathematics includes numeric, measuring, and shape fields."*
Science (Academic)	Academic curriculum Science and Academic Subject	Science, Academic Progress, Academic Curriculum, Academic Course, Academic failure, Academic subject, Academic discipline	*"Sometimes, the educators apply Academi talent as Mathematics and logical talent. While Academic talent and Mathematics are not the same; some similarities might be seen between them, but they should not be considered the same"*
Artistic	Different types of Art	Art competition, Music, Artistic Ability, visual arts, handicrafts, Calligraphy and Marquetry, Painting, drawing	*"We have to concentrate on all kinds of art and developed them. We shouldn't restrict the art ability to drawing or music. Furthermore, there is a discussion regarding whether music ability is an art or a different ability"*
Leadership	Managing, Controlling, Leasdership	Managing of future of society, Management ability in coordinating programs, controlling situation, Managing natural resources, Managing and controlling discussion	*" Leadership talent is the primary talent to be recognised; if we don't manage our natural resources, such as water, we won't make suitable dams to control the flooding. If we do not know how to manage the forests, we will lose them."*
Literacy	Reading, Writing, Speaking	Literacy, Poem, Poet, Reading, Writing, Literacy, Verbal,Culture, Classic literacy, Verbal, Essay, Language Speaking	*"Some people have literacy ability. They are good at writing essays, Reading, and Poems. In other words, they have been developed in verbal ability"*
Technology	Engineering and Practical abilities	Mechanic, Electronic, Computer, Engineering, Programming, Skill Carpentry, Sewing	*"In this modern world, Technology has dominated peoples' life. So, identifying talented students in this domain are in priority"*
Spatical	Visualization and Navigation ability	Visual-Spatial,Finding direction, Finding Address,Visualising, Three dimension visualisation Imagination	"The students with *Spatial talent are good at finding address, direction and anything that relates to navigation"*
Athletic	Sport and Motor ability	Motor skills, Gross motor skills, Fine motor skills, Movement-Athletic intelligence, Sports, Motor development, Psychomotor ability, Sports types, Physical ability	"If *we found that a student is good at movement activities, we have to encourage him to be involved in Athletics activities and ask his parents to support him".*
Social Relationship	Good relationship and Being Sociable	Good relationship, Social relationship, Communication, Empathy skill, Social Skills, Social development, Social intelligence, Social interaction	*"In human science, knowing social skills is crucial. You need to know how to communicate and empathise with people in your personal life and workplace"*
Spiritual and religious	Religious and Spiritual information and behaviour	Religious information, Religious behaviour, Religious culture, Spiritual intelligence	*"Although religion and spirituality are not the same, in my idea, we can consider them as one point. The difference between religion and spirituality is that religion includes spirituality, while spirituality might not involve religion"*
Entrepreneure	Being creative and challengeable With risk ability	Creativity, Risk ability, Discovering the relationship between phenomenons, Challengible behaviour, Having different and special view to the phenomenons	*"To identify the students with Entrepreneur ability, we need to identify the students with the risk ability in schools and support them"*

In this study, the core categories found were the experts' views regarding culturally valued domains in Iran that were realised as crucial domains in talent identification (Table 2).

Table 2

Code Frequency Table for Research Question

Code No	Structural Codes	f
1	Logical and Mathematical	13
2	Science (Academic)	5
3	Artistic	10
4	Leadership	6
5	Literacy	8
6	Technology	6
7	Spatical	4
8	Athletic	11
9	Social Relationship	7
10	Existential, Spiritual and religious	6
11	Entrepreneure	3

Table 2 shows that the many experts agreed on the Logical and Mathematical, Athletic, and Artistic domains. Thirteen experts referred to the Logical and Mathematical domain, eleven experts referred to the Athletic domain, and ten experts referred to the Artistic domain. Some of the experts agreed on literacy(8 experts), social relationships(7 experts), leadership(6 experts), technology, existential-spiritual-religious(6 experts), and science(5 experts) domains. Also, a few of the experts mentioned spatial(4 experts) and entrepreneur(3 experts) domains.

Discussion and Conclusion

The Logical and Mathematical Domain

This study investigated the culturally valued domains in talent studies in Iran based on experts' views. The unstructured interviews were conducted with fourteen experts. Grounded theory was used to collect, analyse, and interpret data. After analysing interviews with open, axial, and selective coding, which are vital concepts in grounded theory, eleven domains were identified as culturally valued. However, the experts emphasised some domains over others. For instance, thirteen experts emphasised Logical and Mathematical talent. The importance of mathematics can be seen in Iran when the students' mathematics performance in Trends in International Mathematics and Science Study (TIMSS) were low. So, Iran's education system and curricula decided to exert a real radical change in the mathematic curriculum in 2011 (Den Heuvel-Panhuizen, Sangari, & Veldhuis, 2021). The logical and mathematical domain introduced as a priority valued domain in this study, is consistent with the Universal Abilities Scale (UMAS; McCallum & Bracken, 2012), which aims to screen pupils' behaviour in numerous domains such as mathematics. Furthermore, the Munich Longitudinal Study of Giftedness model, designed in Germany (Heller, Perleth, & Lim, 2005), and the Gifted Rating Scale (GRS) designed in the United States also refer to logic ability as intellectual ability. In addition, Renzulli, a prominent theorist in talent studies, points to logic ability as a mathematical characteristics in his scale (Renzulli, 2010).

Athletic Domain

The second domain that was emphasised more by the experts was the Athletic domain. All 11 experts who mentioned the Athletic domain believed that investment in the Athletic domain is necessary for each society as sports competitions globally are valuable. Interestingly, one of the experts also referred to the difference between Athletic ability and muscular-motor control gifts introduced by Gagne (2004) and the psychomotor domain in the Munich Longitudinal Study of Giftedness model, designed in Germany (Heller, Perleth, & Lim, 2005). The expert who was the deputy manager of the NODET believed that in talent studies, three strata should be considered. He stated that " I am going to speak about athletic ability, which is seen in the performance of athletes. The athletes' performance originates from three strata. The first step is the speed and accuracy of processing information with regards to kinetic ability. It causes the second step, which Munich Longitudinal Study of Giftedness model refers to it as psychomotor ability, and Gagne (2004) refers to it as muscular-motor control gifts. The two strata interact with the environment, and as a result, stratum three will appear. In other words , when the performance of an individual can be seen in society, it is called athletic ability. He emphasised that Athletic ability is something that is seen at a society level, whereas psychomotor ability is apparent at the individual level. It would be interesting to consider the possibility of differences between psychomotor an athletic abilities, as there is a lack of research in this area. About the Athletic

domain, these days, some opportunities have been created in Iran regards to sports. For instance, Iran's government has invested in privatisations and commercialising sports clubs, the collaboration between sports institutions and clubs, and supporting the Ministry of Sports (Pishva et al. 2021).

Artistic Domain

The third domain was the Artistic domain, which ten experts pointed out. Six experts referred to drawing, visual arts, handicrafts, Calligraphy and Marquetry. Furthermore, five experts believed that artistic ability should not be limited to visual arts in the educational system. They thought that the musical domain should be considered within artistic ability or as a separate domain in talent studies because of its importance in peoples' lives. Because some experts have mentioned musical talent, it comes to mind if the artistic domain of GRS, which refers to musical ability, will be useable in talent identification in Iran or no. On the question of that, religious values, especially the crucial role of religious values regarding females in Islamic countries, will restrict the use of GRS in Islamic countries. Rhythm, melody and media communications are factors that are mentioned as substantial questions in the Artistic subscale of GRS. At the same time, there are few opportunities for people, especially for females, to perform their ability in musical domains and being recognised as artistic talent. Hence, the questions for the artistic domain should be designed according to culturally artistic valued domains in Iran.

Literacy Domain

The fourth domain was literacy. Six of the eight experts interviewed stated that Iran is outstanding in the literacy field. They also referred to the roles of Iranian Poems and literature in Persian civilizations and the importance of identifying talented students in these fields. In this regard, Shiraz is a city in Iran known as "the city of knowledge" because of forms of knowledge, notably history and poetry. Shiraz had remarkable effects on the civilization of Iran , social and ethical behaviour among Iranian people (Manoukian, 2012). The Literacy domain emphasised by the Iranian experts has also been introduced in UMAS for screening pupil's behaviour. In addition, Renzulli (2010) referred to reading characteristics in SRBCSS.

Leadership and Social Relationship Domain

The other domains discussed were Leadership and Social relationship domains. Six of the experts argued that the social relationship is an aspect of the leadership domain and not separate. However, seven of them thought that the social relationship is a separate domain and not necessarily an important factor in leadership which could depend upon power rather than social communication. They also pointed out that somebody who has an excellent social relationship may not have leadership ability. In this regard, the Munich Longitudinal Study of Giftedness model and the DMGT model introduced by Ganier point to social competence and social gifts, respectively. Furthermore, Kafashpoor et al. (2013) have reported that leadership and organizational culture are pivotal factors in the success of organizations in Iran. Panahi (2021) also refers to transformational leadership, innovative leadership and genuine leadership in the effectiveness of organisations in Iran. So, it is needed to find the students who have leadership abilities and support them. These students can play a significant role in the success of organisations in future.

Technology Domain

Six experts emphasised by explaining that technology has revolutionised peoples' daily lives. So, identifying talented students in the technology domain can significantly impact peoples' lives in this modern world. It is consistent with Renzulli (2010). Iran is one of the top countries in the world regarding the number of graduates in engineering and technology disciplines. In contrast, there are not enough job opportunities for graduated people (Heshmati, & Dibaji, 2019). If Iran concentrates correctly on this discipline, finds talented students in this field and considers appropriate technical and vocational training at the college level, it can play an essential role in the technology world.

Existential, Spiritual and Religious

The next domain that was stressed by six experts was the existential, spiritual and religious domain. Gardner (1999) also referred to this domain as spiritual and existential intelligence. The first interviewee raised the point that Iran is a religious country, and the spiritual-religious domain needs to be considered in Iran as one of the essential domains in talent studies. Three experts strongly emphasised the importance of this domain, which caused some discussion among the research team, and it was agreed by the research team members that this domain should be asked about separately at the end of the interview if the experts did not mention it. When the experts responded to the question regarding the religious domain, eight of them claimed that this domain should not be considered as a talent domain; they stated that religion depends on nurture more than nature. Interestingly, they noted that religion is not a talent, and it originates from the context, environment, education and nurture. One of the experts used an example to explain about it. He said, " imagine that you have grown up in a religious family; so you will be influenced by your

family's and the environment's values that you have grown up with ". The other expert referred to the religious ability by stating that "Religion is not a talent, but the ability to understand spiritual and existential events and interpret them is a talent. As arm strength is not talent but the ability to use it to do sports is a talent."

Six of the experts believed that the religious domain should be considered as one of the talent domains. In Iran, the remarkable role of religion, such as Zoroastrianism and Islam, can be seen in Persian identity and culture's "practical" definition. For example, some famous poets in Iran, such as Saadi, Roudaki, Ferdowsi, Attar, Hafez, Rumi and Nezami, are more influenced by Islamic thoughts (Davari, 2018). The Islamic Revolution restrengthened religion in Iran, and religion always has been the core of the Islamic Revolution (Fazeli, 2006). In literacy of talent and giftedness, the religious domain just has been mentioned by Gardner, and non of the other researchers such as Renzulli (2002) and Pfeiffer (2015) have considered the spiritual domain a talent domain.

Academic Domain

The other domain that the experts underlined was the academic domain. Five experts explained that some students are good in some academic domains such as science and history and the other fields according to their curriculum. The Science domain is one of the underlying domains in Iran. Iran reached first place in the world in the growth rate of scientific publications (Akhondzadeh, 2013; MacKenzie, 2010). It is remarkable growth that has been mentioned in the American National Science Foundation's report as well (White, 2019). The Science domain, which experts emphasized, was also consistent with the Universal Abilities Scale (UMAS; McCallum & Bracken, 2012), in which science has been considered as one of the subscales. Their opinion was also supported by the Gifted Rating Scale (Pfeiffer & Jarosewich, 2003) and the Behavioral Traits Assessment Scale (Renzulli et al. 2010) that applied academic subscale and science characteristic respectively.

Spatial Domain

Spatial domain was the other domain that four experts referred to that. They believed that some students are good at navigation, finding addresses and reading maps. For instance, one expert said, " I had a student who was very good in geography, but he was not good in other subjects. I asked his parents to have a meeting together, and I explained to them the academic situation of their child; during our conversation, his parents mentioned that he is very good at finding addresses, locations and navigation". Shahab National Plan in Iran was designed based on Gardner's intelligence, and spatial intelligence was one of the important domains reported with high reliability in Alipoor, Ayati and Soorgi (2019) research. Shahab aim was to identify students' talent in primary schools with teacher's reports. In talent and giftedness literature, spatial intelligence has been mentioned by Gardner (1983) as a mental skill to solve spatial problems of navigation, visualization of objects from different angles and notice details. But the spatial domain is not supported by the other scales such as GRS or UMAS.

Enterprenurial Domain

The final doman discussed was the enterprenurial domain.The term "entrepreneur" refers to the founder of a new business or a person "who started a new business where there was none before" (Gardner, 1985). Three experts highlighted this domain. The research team also thought this domain particulary significant because of the need for investment and business. The experts who focused on this domain agreed that one of the problems in Iran is the lack of investment in entrepreneur ability, while according to Iran's situation, because of sanctions, finding the people who can be entrepreneurs are a priority. What is more, they discussed a difference between entrepreneurship and creativity. one of the experts pointed out that " The thing that we need to look for is the entrepreneur ability, not just creativity. He also said that being creative is one of the features of entrepreneurship ability. The other feature is being a risk-taker; not only do we need to find creative people, but we also need to find the risk-taker people".

Recognizing students with entrepreneurial talent and developing their abilities will be crucial in Iran's economic system. Recently, the Iranian government has started a master policy programme for developing economic resilience mainly through creative entrepreneurial and knowledge-based activities (Abdolmaleki, 2014). Smith (2002) also has highlighted the role of creating entrepreneurial opportunities in childhood and being an entrepreneur in adulthood. From the interviews conducted with the Iranian experts, eleven culturally valued domains were considered in talent and giftedness identification. Instead of applying western countries methods in identifying talented students, it is suggested that more culturally appropriate eastern methods are chosen for eastern countries, particularly in Islamic countries, to develop the literature of talent and giftedness studies based on their culture policies. Previously there has been limited literature in this regard, and western methods have influenced the literature of talent and giftedness studies in many eastern countries. It is suggested for future studies to identify the priority talented domains in each culture and prepare a scale basesd on identified domain in each society. It is suggested for future studies to identify the priority talented domains in each culture. These domains can be applied to a scale for identifying individuals'

talents. The culturally-based scale for identifying talents would have been more helpful if it had been applied for universal talent screening among students.

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Research Article

High school students' misconceptions about force: what changed the flipped class experience?

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Abstract

Misconceptions challenge science learning. This study investigated Grade eleven learners' prevalent misconceptions about force using Force Concept Inventory (FCI) and learners' experiences of using flipped class. The sample comprised 190 learners for FCI and 14 learners for Focus Group Discussions (FGD). A quasi-experimental design using Experimental Group (EG), which was taught using Flipped classes and Control Group (CG) taught using Talk and Chalk method (TCM). Descriptive statistics, concentration analysis, t-test and thematic analysis were used to analyse data. Results show an 81.8% prevalence of misconceptions in seven categories. The most common patterns of misconceptions were Low and Low (LL) and Low and Medium (LM), while the least included Medium and Medium (MM). Two themes emerged from FGD: interesting learning about Isaac Newton's background and identifying their incoherent knowledge of the force. It suggests that using flipped classes minimised misconceptions and created interest in science for gifted and less gifted learners, which resulted in improved learners' performance.

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Introduction

Misconceptions are a challenge to learning physics for all learners including the gifted learners. Misconceptions are incorrect understandings of concepts, objects and events (Martin, Sexton & Gerlovich, 2001), which impede learning (Chew, 2005). Learners display misconceptions about force during Grade 12 high-stake examinations (Department of Basic Education, 2012). It implies a need to identify misconceptions per topic at an early stage (Williams, 2009) using Force Concept Inventory (FCI) and address them (Sands et al. 2018). FCI is a low stake assessment tool that is valid, standardised and used for longitudinal studies (McGrath et al. 2015). Therefore, investigating misconceptions using FCI and flipped classes to improve learners' performance including the gifted learners can be a giant in science education. Unfortunately, there are few flipped classes conducted in South Africa secondary schools with both gifted and less gifted learners. This study contributes to learners' misconceptions prevalence regarding force using FCI and to establishing gifted and less gifted learners' experiences of using flipped classes to minimise misconceptions.

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Literature Review

Force Concept Inventory

Concept inventories are diagnostic tools that measure learners' state of knowledge (Sands et al. 2018). Concept inventories provide information on learners' understanding of concepts (McGrath et al. 2015). A variety of concept inventories exist in different disciplines (Gavin-Doxas & Klymkowsky, 2008). In Physics, for example, the FCI is widely used to assess learners' understanding of mechanics (Martin-Blas et al. 2010). The findings from FCI may assist teachers in recognising conceptual coherence (Savinainen & Viiri, 2014).

Misconceptions

Literature shows that learners' initial naïve ideas usually persist unless those ideas are challenged (Williams, 2009). Learners have varying levels of inaccurate knowledge and incorrect beliefs known as misconceptions (Hughe et al. 2013). In previous research, other terms have been used synonymously with misconceptions: preconceptions, naïve beliefs (Mayer, 2002), alternate conceptions (Aikenhead, 2006), personal models of reality (Wiser & Amin, 2001) and unfounded beliefs (Zirbel, 2004). These misconceptions hamper learners' performance.

The Flipped Class

The Flipped Class is a digital technology used to provide content when learners are not in classroom (Jamaludin & Osman, 2014). This approach provides great flexibility for learners to internalise the content (Bergman & Sams, 2012). The current generation of learning is excited to use technology to learn (Agyei, 2021). It is no wonder Mishra and Koehler (2006) contend that effective teaching should embrace Technological, Pedagogical and Content Knowledge (TPACK).

Methods of Minimizing Misconceptions

Methods used to minimise misconceptions include Topic Specific Pedagogical Content Knowledge (TSPCK) (Rollnick & Davidowitz, 2015, Sands et al. 2018), where learning difficulties and misconceptions per topic are identified, and a solution is devised to ease learning. Conceptual Change Model (CCM) (Furqani et al. 2018; Zakiyah et al. 2019) were Predict-Observe-Predict (POE) approach that yielded better conceptual understanding in biology. Problem-Based Learning (PBL) (Sutton & Knuth, 2017), and Flipped classes (Williams, 2016) where a specific activity is designed for gifted and less gifted learners to do, which aims at minimising misconceptions.

Research Problem

Before coming to school, learners hold different misconceptions (Vosniadou & Brewer, 1992), which are deep-rooted and resistant to change (Morrison & Lederman, 2003). The challenge is that physics science teachers in South Africa rarely identify learners' misconceptions and their prevalence using FCI to select a suitable method. If gifted and less gifted learners' misconceptions are not addressed, conceptual understanding of science concepts will be curtailed.

Purpose

The purpose was to identify Grade 11 learners' misconceptions prevalence using Force Concept Inventory (FCI) and establish learners' experiences of Flipped class in Maraba Circuit.

Research Questions

The research was to answer two questions:

- What are the prevalent Grade 11 learners' misconceptions regarding force concept?
- What are the girls' experiences of studying forces using flipped classes?

Method

Research Design

This research employed both quantitative and qualitative approaches (Creswell, 2013). These approaches were suitable because the researchers wanted to identify misconceptions and their prevalence. The quantitative approach used a survey and quasi-experimental designs to identify misconceptions and their prevalence among learners, while flipped classes minimise misconceptions. The qualitative approach sought to establish learners' experiences when studying Force in the South Africa context.

Participants

The population comprised 329 learners from eleven schools in Maraba Circuit, Limpopo of South Africa. A random sample was used to obtain five schools. Yamane (1967) formula below was used to arrive at the minimum acceptable sample of 180 minimum sample size (95%) confidence interval.

$$n = N / (1 + Ne^2)$$

where n represents sample size, N is the known population, and e is the error level. The sample obtained was 190 and was deemed sufficient to represent the population of Maraba Circuit in South Africa since it was more than 180.

Instrument and Procedure

The FCI was developed in 1985 (Hestenes et al. 1985) and underwent extensive trials and refinements (Han et al. 2015). The FCI comprises 30 items that assess understanding of Force. The reliability of FCI has been challenged. Lasry et al. (2011) contend each item of FCI has low reliability, but not the whole instrument. The internal consistency reliability using Kuder-Richardson (K-R20) was between 0.84 and 0.88 for pre-test and post-test, respectively (Persson, 2015). Hence, FCI is construed to measure a unique construct in Physics (Lasry et al. 2011) such as misconceptions prevalence (Bekkink et al. 2016).

FGD interviews (Appendix 1) were conducted to elicited learners' understanding and triangulated the quantitative data (Ehlers, King & Ziyani, 2004; Denzin, 2012). The FGD comprised 14 learners, 6 gifted and 8 less gifted, purposively selected based on the exhibited levels of misconceptions. According to Merton et al. (1990), the number for FGD can range from 12 to 15. For face validity, FGD questions were checked by two teachers, and their recommendations were used to make changes.

FCI was administered to 190 Grade 11 Physical Sciences learners from Maraba Circuit. FGD was held with two groups about where and when they learned about Isaac Newton. Learners were given real-life scenarios regarding force. The discussion stopped in the third session after reaching a saturation point (Krueger, 2002). All the discussions were audio-recorded.

Two classes comprising 41 randomly allocated to Experimental Group (EG), and Control Group (CG) in a quasi-experiment were used for the study. The EG was taught for three weeks using Flipped Classes, where learners viewed videos regarding force before coming to class, while CG used the Talk and Chalk method (TCM) for three weeks. After three weeks, both groups were tested to ascertain their performance. FCI questionnaires were used for pre- and post-test, but the post-test questions were rearranged to minimise recognition.

Data Analysis

Quantitative data were analysed using Concentration Analysis. The prevalence of misconceptions was calculated according to the following formula (Roe & Doll, 2000).

$$Prevalence = \frac{frequency\ of commonest\ \ incorrect\ response}{sample\ size} x\ 100\%$$

The average prevalence P_{av} for all misconceptions identified was calculated using the following formula:

$$p_{av} = \frac{\sum p_i}{n}$$

where p_{av} = *average prevalence,* p_i = *prevalence, and n = number of misconceptions* in a group.

The different choices 190 learners made in FCI were used to calculate the Concentration Factor (C), the learners' selection between the correct choice and the distracters ranges from 0 to 1. Value 0 is the probability that all 190 learners selected A-E choices equally for one item, and value 1 is where all responses concentrate on one correct option (Bao & Reddish, 2001). The concentration factor (C) was calculated using the equation of Bao and Reddish (2001):

$$C = \frac{\sqrt{m}}{\sqrt{m}-1} \times -\left(\frac{\sqrt{\sum_i^m n^2}}{N} - \frac{1}{\sqrt{m}}\right)$$

where *m* connotes choice numbers A to E, *n* represents the number of learners choosing an option, *N* is the sample. To identify whether learners selected choices guided by force knowledge or random guessing, the correct answer scores (S) were normalised to the interval [0, 1]. The score was categorised into three levels: Low (L) = 0 ~ 0.4); Medium (M) = 0.4 ~ 0.7); and High (H) = 0.7 ~ 1.0). Similarly, for C values the three levels were Low (L) = 0 ~ 0.2); Medium (M) = 0.2 ~ 0.5); and High (H) =0.5 ~ 1.0) (Bao & Reddish, 2001). The S-C patterns range from Low Score-Low Concentration (LL) through Medium Score-Medium Concentration (MM) to High Score-High Concentration (HH) pattern.

Data from quasi-experiment were analysed using a t-test to find out the differences amongst EG and CG for pre- and post-tests. Finally, audio recorded qualitative data from FGD was transcribed by playing it many times to pick the

participants responses; the transcripts were read and re-read to identify specific contextual ideas (Krueger, 1994) and similar ideas were identified and grouped into themes.

Results

Quantittative Results

Grade 11 Learners' Misconceptions Prevalent the Misconceptions Regarding the Force Concept

Seven categories of misconceptions were prevalent and their prevalence percentages are presented (Table 1).

Table 1

Seven Categories of Prevalent Misconceptions and Their Prevalence Percentage

Misconception category	Inventory Item	Frequency	Prevalence (%)	Average Prevalence $p_{av} = \sum \frac{p_i}{n}$ (%)
Gravity	1	146	76.8	78.4
	2	153	80.5	
	4	123	64.7	
	13	174	91.6	
Active forces	3	143	75.3	81.8
	5	161	84.7	
	26	162	85.3	
Impetus	1	146	76.8	85.4
	5	161	84.7	
	10	161	84.7	
	11	165	86.8	
	13	174	91.6	
	18	161	84.7	
	30	168	88.4	
Combination of influences	8	137	72.1	83.8
	17	150	78.9	
	21	180	94.7	
	23	170	89.5	
Kinematics	14	172	90.5	91.7
	19	175	92.1	
	20	176	92.6	
Other influences on motion	6	163	85.8	81.3
	7	155	81.6	
	25	151	79.5	
	27	149	78.4	
Action/Reaction pairs	4	123	64.7	70.0
	28	143	75.3	
Average				81.8%

Table 1 summarises the average prevalence of each of the seven misconception groups ranging from 70.0% (Action-reaction pairs) to 91.7% (Kinematics) and an average misconception rate of 81.8% was achieved.

The FCI diagnosed learners' misconceptions. The identified misconceptions, Scores, Concentration Factors and Score-Concentration (S-C) prevalence were calculated according to Roe and Doll (2000) (Table 2).

Table 2

Misconceptions Held by Learners in %, Scores (S), Concentration Factor (C) and S-C pattern

Item	A (%)	B (%)	C (%)	D (%)	E (%)	Correct Answer	Score (%)	S [0-1]	C[0-1]	S-C Pattern /Model
1	27.4	15.8	23.2	23.2	10.5	C	23.2	0.23	0.00	(LL)
2	19.5	32.1	26.8	13.7	7.9	A	19.5	0.20	0.13	(LL)
3	7.4	37.9	24.7	2.6	27.4	C	24.7	0.25	0.29	(LL)
4	41.1	4.7	8.9	10.0	35.3	E	35.3	0.35	0.37	(LM)
5	14.7	15.3	28.9	20.5	20.5	B	15.3	0.15	0.05	(LL)
6	18.9	14.2	13.7	13.2	40	B	14.2	0.14	0.18	(LL)
7	17.9	18.4	18.9	7.9	36.8	B	18.4	0.18	0.15	(LL)
8	28.9	27.9	18.4	14.7	10.0	B	27.9	0.28	0.10	(LL)
9	11.6	36.8	14.7	10.0	26.8	E	26,8	0.27	0.18	(LL)
10	15.3	16.8	6.3	47.4	14.2	A	15.3	0.15	0.33	(LM)
11	4.7	33.2	41.6	13.2	7.4	D	13.2	0.13	0.35	(LM)
12	17.4	33.7	26.3	22.1	0.5	B	33.7	0.34	0.21	(LM)
13	18.4	40.0	20.5	8.4	12.6	D	8.4	0.08	0.20	(LM)
14	30.0	42.1	13.7	9.5	4.7	D	9.5	0.10	0.32	(LM)
15	38.4	24.7	21.1	14.2	1.6	A	3.84	0.38	0.25	(LM)
16	38.9	14.7	23.7	10.5	12.1	A	38.9	0.39	0.19	(LL)
17	36.3	21.1	17.4	15.3	10.0	B	21.1	0.21	0.14	(LL)
18	11.6	15.3	38.4	33.7	1.1	B	15.3	0.15	0.32	(LM)
19	41.6	10.5	6.8	33.2	7.9	E	7.9	0.08	0.34	(LM)
20	30.5	10.5	35.3	7.4	16.3	D	7.4	0.07	0.21	(LM)
21	15.3	51.1	20.0	8.4	5.3	E	5.3	0.53	0.43	(MM)
22	26.3	35.3	6.3	23.2	8.9	B	35.3	0.35	0.20	(LM)
23	20.5	10.5	36.3	21.1	11.6	B	10.5	0.11	0.15	(LL)
24	37.9	15.8	27.9	8.4	10.0	A	37.9	0.38	0.22	(LM)
25	28.4	23.2	20.5	16.3	11.6	C	20.5	0.21	0.06	(LL)
26	35.3	24.7	13.2	12.1	14.7	E	147	0.15	0.14	(LL)
27	28.4	40.0	21.6	5.3	4.7	C	21.6	0.22	0.31	(LM)
28	6.3	22.1	11.6	35.3	24.7	E	24.7	0.25	0.18	(LL)
29	27.4	37.9	17.9	3.7	13.2	B	37.9	0.38	0.24	(LM)
30	10.5	21.1	11.6	25.8	31.1	C	11.6	0.12	0.11	(LL)
						Average	21.1%			

Table 2 shows that 21.1% of the learners correctly answered FCI items. The most common S-C patterns were Low Score-Low Concentration (LL), Low Score-Medium Concentration (LM), and there was only one item which represented Medium Score-Medium Concentration (MM) and none in the High Score-High Concentration (HH) pattern.

The Concentration Factors (C) were plotted against the Scores and are presented in Figure 1.

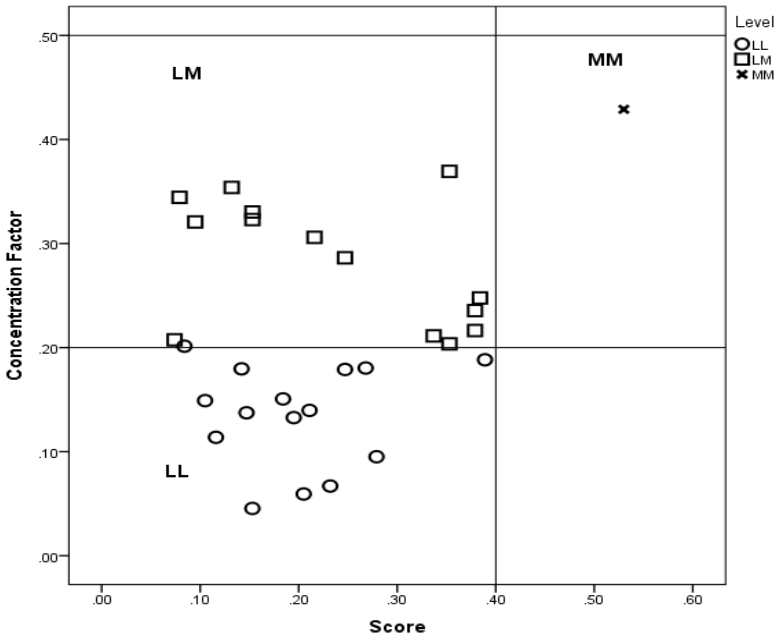

Figure 1

Concentration-Score Plot of Choices Between Correct Answers and Distractors on FCI items

Figure 1 shows that fifteen responses were in the LL, fourteen in the LM, one in the MM and none in HH levels.

Table 3

Post-test Results for CG and EG of Flipped Classroom

Group	Number	Mean	SD	T-test	*p*
Control	41	12.98	25.12	7.63	0.00*
Experimental	41	19.66	11.06		

The results from the quasi-experiment show the Flipped class (mean = 19.66; 11.06 SD), while the control class which did not use Flipped classes (mean = 12.98;25.12SD). These values were significantly different amongst pre- and post-test in the Flipped classes, suggesting that Flipped classes minimised misconceptions and improved performance in EG but not in CG, which did not use Flipped classes ($t = 7.63$; $p<0.05$).

Qualitative Research Results

Questions 2: What are the learners' experiences of learning Force using Flipped class?

While quantitative data provides misconceptions and their prevalence, the qualitative approach provides learners' experiences of Flipped classes. Two themes emerged: interesting to learn about Isaac Newton's background, and identifying their incoherent knowledge of Newtonian Physics.

Theme 1: Interesting learning about Isaac Newton's background.

FGD delved into the history of Newtonian laws. First, learners were required to explain their views regarding Isaac Newton and learn about him. After that, they shared their experiences of using Flipped classes. Verbatim statements on the concluded issues are reported from FGD Session one: *"He was the first person to discover that there's gravitational force by seeing an apple fall when there was no wind". "We know Newton to be a person who came about with three laws of physics, that is Newton's law of motion one, two and three, and the law of universal gravitation."*

FGD sessions dealt with learners' knowledge of Newton as a person and concluded that Newton was the first person to discover gravitational force by observing an apple falling when there was no wind and formulated three laws of motion.

Theme 2: Identifying their incoherent knowledge of Force.

FGD sessions two and three are reported here below. Session two: A box is being pushed along a smooth horizontal surface with constant force. The applied force is removed. Describe the motion of the box. Next are verbatim statements agreed upon: *"It will constantly move until it stops because it's on a smooth surface, and there's less friction". There must be a force or an external source of power.*

"It will move a little then stop. The stopping is because of less friction on a smooth horizontal surface. So, if it goes forward it will not stop immediately, it will move until friction stops it

Also:

"And when there is friction, it acts opposite to the applied force. Friction acts opposite to the applied force. Since the applied force has been removed, there's no way that it can continue moving. And immediately when you leave the box, friction opposes its motion. So, it will just stop, unless it was on a steep path."

It was concluded that an object moves if there is an applied force to overcome friction. Thus, motion in one direction is opposed by friction unless a slope will compensate for the friction.

Still, during session two, a second task was: On a rainy day, friction was negligible. A car moves with constant velocity and a straight level (tarred) road that curves sharply towards the end. Explain the motion of the car. Learners explained: *"Because of Newton's second law which states that when a resultant force is exerted on a body, it causes the body to move towards the exerted force. Newton 1 and 2 apply."*

Also, for them to understand the content they stated that *"an approach was interesting because it allowed us to manipulate apparatus and find solutions to understand everyday life problems."*

The session concluded that: *"If the driver does not 'do something' the car will go straight and not curve with the road."*

FGD session two concluded that an object moves toward force applied according to Newton's laws one and two and that the driver should stop the car from going straight.

Session three, the task was: A big truck collides head-on with a small car. What can you say about the force a truck exerts on the car compared to the car's force? A few learners correctly applied the third Newton's law. *"They're equal but opposite in direction."*

Majority of learners expressed: *"Force applied to a small body by a big body* is bigger than the reaction force *applied to big body by the small one."* Others responded: *"The mass of the truck is high, and the mass of the car is small so the small car would be crushed."*

FGD session three considered a force to be related to the size of the object. The truck has more mass than a small car. Therefore, during a truck and a small car crash, the small car will be crushed more.

Another task for FGD session three was: An object is thrown vertically upwards. Identify the forces acting on a body that is thrown by a hand. Also, compare the object's speed when it is going upwards and its speed when it comes downward. The following are the conclusions made: *"When it is up there, it will have a speed limit. When it gets up, it will stop somewhere because there is nothing that pushes it anymore. Then it will return because of gravity."*

"By throwing the object up, you exert a force on it. When it returns, there is no person or anything that is pushing it down."

Also,

"Because it was given a start, it goes up; it goes with a certain high velocity. Then when it comes back because gravity will be pulling it, it will come down, but the speed is not the same, it is less than when you threw it up. Applied force goes in the same direction as normal force.".

On how to ease the understanding of the force concept, it was stated that "*Tasks were very interesting and easy to understand, but more activities are needed like solving real everyday human challenges."*

FGD session three concluded that a projectile move upwards because it is being pushed up and returns under the force of gravity at a different velocity than upward motion. It was noted that if a learner missed one question on a specific concept like motion or mass, that learner was most likely to miss other questions in the same sequence.

Discussion and Conclusion

The study sought to identify Grade 11 learners' misconceptions prevalence using the Force Concept Inventory (FCI) and establish learners' experiences studying force using Flipped classes to minimise the identified misconceptions. The results show learners had a high prevalence of misconceptions (Table 1 and 2). Flipped classes created interest in learners to examine their everyday ideas incoherent with science because misconceptions increased the chances of missing the acceptable answers (Scott & Schumayer, 2018).

Identify misconceptions were addressed using flipped class, which minimised misconceptions. Results from Flipped classes suggest that the teachers' Pedagogical Content Knowledge (PCK) and Technological Pedagogical Content Knowledge (TPACK) affected learners' experiences. This observation agrees with Scott and Schumayer (2018), who contend that instructions designed to minimise misconceptions were positively correlated with improvements in the learners' conceptual understanding of science. It is no wonder some learners performed well and had a desire to continue studying science.

The low score (S) and the low Concentration factor (C) suggest that learners had no clear understanding of Force. These results mirror Hestenes, Wells and Swackhamer (1992), where one group of learners scored an average of 20%, while another group scored 23% on the FCI. The S-C plot exhibits low Scores and concentration factors with 50% as LL and 47% responses with LM and 3% in the MM domain (Figure 1). These results suggest that learners' answers

were in two patterns: low (LL/LM) and medium (MM) (Figure 1). It may imply a dominance of random guessing when answering questions on FCI (Bao & Reddish, 2001). These results suggest that the teaching did not assist learners to recognise the distractions in FCI. Hence, the majority (190) learners could only answer the FCI in the LL and LM domains, with very few in the MM area (Table 2, Figure 1). These results corroborate the poor science performance at national public examinations in South Africa (Onwu & Stoffel, 2005; Department of Basic Education, 2014) and the outcomes of the Third International Mathematics and Science Study (TIMSS) (Gonzales et al. 2004). In this research, the poor performance on Force may suggest a poor sequencing of topics and the lack of practical work in some schools in Limpopo Province (Dudu & Vhurumuku, 2012). Also, Spaull (2013a; 2013b) shows that systemic flaws in school science education negatively impact tertiary learning, suggesting learners have misconceptions (Zirbel, 2004). We contend that more studies should focus on identifying misconceptions in different science topics to discover other misconceptions.

In FGD, learners displayed a naïve level of understanding of force, namely: 1) constant speed and sudden stop, or 2) sudden stop and gradually slowing down. Learners understood the effect of friction; however, they did not understand the behaviour of the box after the push was removed. Two learners stated Newton's second law in the session but did not apply it to the situation. Thus, Group two concluded: "*If the driver does not 'do something, the car will go straight and not curve with the road"*. These responses suggest learners did not know that the driver could change acceleration (*a*) by 1) stepping on brakes to reduce velocity (v); 2) releasing the foot from the accelerator pedal reducing fuel entering the carburettor, and 3) steering the car along the curve which changes the angle of velocity. They did not articulate that centripetal acceleration $a = (v^2/r)$ is inversely proportional to the radius (r) of the curve. Steering around a sharp curve of small radius at high velocity makes a large acceleration, which may slip wheels. The three actions must produce static friction between tyres and the road to keep the car moving along the curve, suggesting centripetal force $F_c = m\,v^2/r$ equals the static friction $\mu_s mg$ (where F_c is a centripetal force, μ_s coefficient of static friction, m = mass and g =gravitational acceleration). Thus, the driver must brake to reduce linear velocity (v) and change the direction slowly since angular velocity (ω) is v/r. It is an impetus dissipation misconception reported (Scott & Schumayer, 2018). The learners could not answer question 7, which dealt with understanding impetus worldviews and required complex reasoning. This observation agrees with the learners' achievement related to teachers' sound PCK (Shulman, 1986) and TSPCK (Rollnick & Davidowitz, 2015).

During the FGD, most learners provided answers to science questions but did not explain the underlying scientific concepts, suggesting learners had a superficial understanding of the force. This finding agrees with Handhika et al. (2017), who contend learners do not understand the force concept. It implies that teaching needs inculcate understanding through meaning-making, reasoning and communication (White & Gunstone, 1992). Thus, teachers need to deal with misconceptions that hinder learners from gaining understanding.

Learners' performance from the Flipped classes suggests learners developed conceptual understudying. These findings corroborate Williams (2016) and Cagande and Jugar (2018), who contend that flipped classes improved medical students' conceptual understanding. The learners' strategy of viewing and sharing ideas regarding force concepts. Thus, the flipped class intervention minimised misconceptions in gifted and less gifted learners and improved performance. Two limitations are using one topic in physics and a small sample from a rural context.

In conclusion, learners displayed a high prevalence of misconceptions in seven categories. The high prevalence of misconceptions suggests the poor acquisition of physics content knowledge and that teachers did not identify learners' misconceptions to address them. Similarly, FGD learners explained Force using their everyday experiences, which were incoherent with science. This study contributes to an effective flipped class strategy, which created interest in gifted and less gifted learners, minimised misconceptions, and improved learners' conceptual understanding of Force. The effect of flipped classes on other topics in physics applied to a larger sample from different contexts is unknown. Therefore, further studies are needed regarding misconceptions and Flipped classes using different topics in science.

Recommendations

Recommendations for Applicants

While misconceptions are a challenge in learning science, they are not easily identified by science teachers and hence teachers design no strategies to address those misconceptions. The researchers recommend that:

- science teachers should use Force Concept Inventory to identify misconceptions and their prevalence among their learners
- science teachers should use different strategies to minimise misconceptions.

Recommendations for Further Research

- Teachers should use Flipped classes on other topics to minimise misconceptions.
- Teachers should use Flipped classes on different science topics and use Flipped classes in different subjects.

Limitations of Study

The limitation of this study was the small sample of 190 learners from one province in the country. The other limitation is that the sample was from a rural context, and therefore, it is not clear what the findings would be from other contexts: semi-urban and urban areas.

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Appendix 1
Questions for FGD Sessions

Questions for FGD Sessions

Q1. What are your views regarding Isaac Newton?
Q2. When and where did you encounter Isaac Newton?
Q3. What striking thing do you remember about him?
Q4. Why do you think so? Tell me how did you come to know Newton Isaac?
Q5. In your understanding describe the motion of the box in question
Q6. If a car moves with constant velocity along a straight level (tarred) road that curves sharply towards the end, describe the motion of the car.
Q7. If there is a move in the direction of force applied according to Newton's law 1 and 2, considering the motion of the car, what do you think will be the action of the driver to stop the car?
Q8. What do you think can help you to grasp force concept and why?
Q9. A big truck collided head-on with a small car. What can you say about the force truck's force exerted on the car compared to the car forces exerted on the truck?
Q10. An object was thrown vertically upwards. Identify the forces acting on the object going up and down. Will the forces upon the object are the same until it lands or not?

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Research Article

Working memory based early intervention program for gifted preschoolers: an effectiveness study[1]

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Abstract

In the literature, it has been shown that working memory, which plays an important role in cognitive development of preschool children and is a concept intertwined with cognitive activities, can be improved. The purpose of this study is to examine the effect of early intervention programs for improving working memory on the working memory performance of gifted children in the pre-school period. In the study, pre-test post-test experimental design of unequal groups of quasi-experimental designs was used. While an early intervention program to improve working memory was applied to the experimental group, the control group did not benefit from this training. The study group of the research consisted of a total of 67 children. The data collection tools used in the study consisted of three groups: scales for identifying and typical development, the scale for determining effectiveness of the early intervention program, and scales to determine the social validity of the study. The quantitative findings showed that the early intervention program developed improved the working memory performance of both gifted and typically developing children. In addition, the students who participated in the study and their parents and teachers found the early intervention program useful. It was observed that the study provided social validity

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Introduction

Some children may be significantly advanced than their peers in many skills (e.g. cognitive skills, academic abilities, interpersonal skills) in early childhood (Olszewski-Kubilius, Limburg-Weber and Pfeiffer, 2003). According to Cukierkorn, Karnes, Manning, Houston, & Besnoy (2008), general characteristics of gifted children in the preschool are: verbal skills developed in a unique and significant way according to age and language use, emotional sensitivity, sensitivity to problems, development, leadership and leadership in cooperative plays, early awareness of differences, using unusual objects in their games, advanced humor ability, metacognitive control, curiosity, advanced cognitive skills, academic achievement and early reading. Currently, an important target of early childhood education is to improve the preconditions that children will need for their success in school and in their future by ensuring their cognitive skills and socialization (Pianta, Barnett, Burchinal, & Thornburg, 2009). Silva (2009) suggested that there is not a single age at which children are developmentally ready to learn more complex thinking styles. Similarly, Kennedy,

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Fisher & Ennis (1991), examining the literature, concluded that although it seems that thinking skills develop with age, the education of these skills can be utilized in the preschool period.

When we examine the skills that thinking skills contain, it is seen that they include important cognitive skills such as analyzing claims or evidence, making inferences by using inductive or deductive reasoning, judgment and evaluation), decision making and problem solving. (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Halpern, 1998; Paul, 1992; Tindal & Nolet, 1995; Paul, 1992; Willingham, 2007). Other skills and behaviors defined in this regard include asking and answering questions for explanation, defining terms (Ennis, 1985), determining assumptions (Ennis, 1985; Paul, 1992), interpretation and explanation (Facione, 1990), verbal reasoning, especially in relation to the concepts of probability and uncertainty (Halpern, 1998), guessing (Tindal & Nolet, 1995), and understanding both sides of an issue (Willingham, 2007). Many of these cognitive abilities are called executive functions. In other words, executive functions are the processes that change the operation of other processes and are responsible for coordinating mental activity in order to achieve a specific target (Smith & Kosslyn, 2010: 281). This term comes from Alan Beddeley's effective working memory model, in which there are separate short-term storage systems with verbal and visual information and a central executive working in this warehouse (Smith & Kosslyn, 2010: 281). Working memory, which has been proven to be closely related to a series of executive functions (Smith & Kosslyn, 2010: 318), was described by Baddeley-Hitch (1974) as a structure consisting of two short-term repositories and a control system. According to this structure, working memory is not a station task where basic information waits in the long-term memory path. In contrast, the task of working memory is to allow complex mental information that needs to be integrated, coordinated, and manipulated by multiple pieces of mentally represented information. Secondly, according to this model, there is an inseparable relationship between the control system, which manages the accumulation and elimination of information and is called the "central manager," and storage buffers. This close relationship allows short-term storage to serve as effective working areas for mental operations. Thirdly, this model suggests that there are at least two different short-term memory buffers for verbal information and visual spatial information (Baddeley-Hitch, 1974).

According to the model, three components of working memory (central executive, phonological loop, visual spatial sketchpad) communicate in order to provide a working area for cognitive activities (Smith & Kosslyn, 2010: 249). A better understanding of human working memory has important effects on understanding why people differ in cognitive skills and abilities and why they have different degrees of success in achieving their real-life targets (Smith & Kosslyn, 2010: 241). Research suggests that working memory capacity, defined as the amount of accessible information (Daneman & Carpenter, 1980), varies among individuals and these differences predict the rate at which skills such as general intelligence (measured by standard IQ tests), verbal SAT scores, and even computer programming are acquired (Kane & Engle, 2002; Kyllonen & Christal, 1990; Smith & Kosslyn, 2010: p.241).

Working memory is known to affect a wide range of cognitive skills, which are not as common as following a clue. Considering how much it affects in general in this direction, it is seen that the relationship between working memory and cognitive skills is not surprising. Research on this subject has been further advanced by seeking answers to these questions: "Why do people's working memory capacities differ so much, and in exactly what area are these differences? If we can understand more clearly the components of working memory and which states are critical to real-life cognitive achievement, what methods can be developed to train and work to increase working memory function and enrich one's cognitive repertoire? " (Smith & Kosslyn, 2010: 241).

Studies with different needs groups (gifted children, ADHD) and children with typical development (Klingberg, Fernell, Olesen, Johnson, Gustafsson, Dahlström, Gillberg, Forssberg, & Westerberg, 2005; Kerns, Eso and Thomson, 1999; Klingberg, Forssberg, & Westerberg, 2002; Leana-Taşçılar & Cinan, 2014; Thorell, Lindqvist, Bergman Nutley, Bohlin, & Klingb) show that working memory can be improved with education (Thorell, Lindqvist, Bergman Nutley, Bohlin, & Klingberg, 2009). These and similar findings show the positive effects of cognitive skills training. Early intervention is very important to support cognitive development (Rueda, Rothbart, McCandliss, & Posner 2005). In some studies in the literature (Carlson, 2005; Diamond, Barnett, Thomas & Munro, 2007; Diamond & Lee, 2011; Grunewaldt, Løhaugen, Austeng, Brubakk, & Skranes, 2013; Kroesbergen, van't Noordende & Kolkman, 2014; Bull, Espy, & Wiebe, 2008; Passolunghi & Costa, 2016; Rueda et al., 2005; Tho) an early intervention program was implemented to improve the cognitive skills and working memory of preschool children and positive results were shown. In Thorell et al. (2009), preschool children were given computer-based training for 5 weeks to improve their visual-spatial working memory. As a result of the study, it was observed that children who received training improved significantly in working memory tasks, and it was observed that working memory training could have significant effects on preschool children. In another study by Kroesbergen, van't Noordende, & Kolkman (2014), children's working

memory and early number perception were examined at the end of the general working memory training given to preschool children. At the end of the four weeks of education, it was concluded that children's working memory and early number development significantly changed. In the literature, there are also studies that reveal relationships between individuals' working memory and intelligence development, except for early childhood.

When we examine the early intervention programs for gifted children in the preschool period and the studies in this field, which are an important point of the study, we see that the studies carried out both abroad and in Turkey (Bildiren, 2016; Karnes, Shwedel, & Lewis, 1983; Karnes & Johnson, 1991; Kitano & Kerby, 1986; Meador, 1994; Saranlı, 2017).

As in all special education groups, early identification of gifted children is emphasized. However, there has not been much progress in the preparation of early intervention programs for gifted at early childhood period (Karnes & Johnson, 1991). Walsh, Kemp, Hodge, & Bowes (2012) examined the services for gifted children in their research and revealed that the least amount of services was given in the preschool period. Early intervention programs for working memory that also improve cognitive skills in the preschool period will be very important.

Based on the literature, the necessity and importance of an intervention program that identifies gifted children in the preschool period as a target group and supports the cognitive skills of these children has been revealed. In this direction, the aim of this study is to examine the effect of early intervention programs for improving working memory on the working memory performance of gifted children in pre-school period. This study will reveal the following:

- Whether the working memory performances of gifted children in the preschool period differ from their peers with typical development,
- The effect of the early intervention program to be applied on the working memory performance of children with gifted and typical development,
- The extent to which the working memory performance of children with special abilities and typical development will be affected by the early intervention program to be implemented.

Method

Research Model

Pre-test post-test experimental design of unequal groups of quasi-experimental designs was used in the present study. In this design, a group in addition to the experimental group is determined for comparison or control purposes. Then the measurements of the subjects in the two groups of the dependent variable are taken before the application. In the application process, the experimental process whose effect was tested is not applied to the control group, while it is applied to the experimental group. Finally, after the experimental procedure, the measurements of both groups regarding the dependent variable are taken with the same or a parallel form (Büyüköztürk, Çakmak, Akgün, Karadeniz & Demirel, 2017; Creswell & Sözbilir, 2017).

Working Group

The working group of the research consists of a total of 67 children who continue preschool education in Izmir in the 2019-2020 academic year. The descriptive characteristics of the working group are presented in Table 1.

Table 1

Demographic Characteristics of the Working Group

Group	Female	Male	Mean Age (month)	RPMTS Mean	ELSS Mean
E (TD)	11	5	65.90	18,2500	63,8125
E (G)	6	11	66.46	27,7059	80,4706
C (TD)	9	8	65.72	17,8824	58,7647
C (G)	7	10	66.40	25,4118	80,9412

E : Experiment Group**,** TD: Typically developed children, G: Gifted Children, RPMTS: Raven Progressive Metris Test Scores, ELSS: Early Literacy Scale Scores

Data Collection Tools

The data collection tools used in the study consisted of three groups: scales for determining gifted and typical developing, the scale for determining the effectiveness of the early intervention program, and scales for determining the social validity of the study.

Measurement Tools to be Used to Identify Special Talented and Typically Developing Children

Candidate Notification Scale for Preschool Gifted Children: The scale developed by Bildiren & Bıkmaz Bilgen (2018) is a scale used to identify gifted children in pre-school period and filled in by teachers. The scale consists of 13 items in 5-point Likert type and three factors (general intelligence, creativity, motivation). The highest score that can be obtained from the whole scale is 65; the lowest score is 13. It was seen that the fit indices of the scale were well fit and between acceptable values, and the structure of the scale with three factors and consisting of 13 items was confirmed as a model. It was found that the scale showed a moderate correlation between the Color Progressive Matrices Test and the CogAT tests. The reliability of the scale, which was calculated using the Cronbach Alpha internal consistency coefficient, was found .95.

Early Literacy Scale: This scale was used in the study to evaluate the upper language skills of the children. The scale developed by Kargın, Ergül, Büyüköztürk, & Güldenoğlu (2015), is a measurement tool that aims to determine the early literacy skills of children in the age group of 5 in a valid and reliable manner. The scale consists of 7 subtests (Receptive Language, Expressive Language, General Naming, Functional Knowledge, Letter Knowledge, Phonetic Awareness and Listening Comprehension), which include reading and writing skills. The factor load values of the items in the subtests of the test consisting of 102 items are between .33 and .93, with KR20 reliability coefficients .65. Test-retest reliability coefficients ranged between .56 and .89, and criterion validity calculations calculated with TEDİL (a valid and reliable literacy test) in receptive and expressive language subtests ranged between .37 and .54.

Raven's Color Progressive Matrices Test: The scale has been developed to evaluate cognitive development and intellectual ability. The scale consists of 36 items in total, 3 sets of 12 items each. The subscales are named A, AB, and B. The scale aims to evaluate the cognitive processes of children under 11 years old. The validity and reliability studies of the scale for 4-6 years old and 3-9 years old children were carried out by Bildiren (2016) and Bildiren (2017). Test-retest and parallel form reliability were used for reliability studies. There is a moderate, positive and significant relationship between the AB Set of the test and the Test-Retest results ($r = 0.436$; $p < .01$). It is seen that there is a moderate, positive and significant relationship between Set B and Test-Retest results ($r = 0.350$; $p < .01$). It is seen that there is a moderate, positive and significant relationship between total test and Test-Retest results ($r = 0.551$; $p < .01$). For validity analysis, the relationship between Bender-Gestalt Visual Motor Perception Test, WISC-R and TONI-3 tests was examined. In line with the findings obtained, it was concluded that the scale is valid and reliable for children in the 4-6 age group.

Measurement Tool to be Used to Determine the Effectiveness of the Early Intervention Program

Working Memory Scale: The scale developed by Ergül, Özgür-Yılmaz & Demir (2016) aims to determine the working memory performance of children in the 5-10 age group. The scale consists of nine subscales in four dimensions, namely verbal and visual working memory and verbal and visual short-term memory (Digit Recall, Word Remember, Meaningless Word Remember, Back Digit Recall, First Word Remember, Pattern Matrix, Block Recall, Choosing the Different, Spatial Discrimination). The validity and reliability study of the scale in Turkey's norms was conducted with 1,494 children between the ages of 5-10. While 634 of this number took part in the trial application carried out in two stages, 860 of them took part in the basis application. While the content validity of the scale was ensured with the expert opinion of the scale, exploratory and confirmatory factor analysis was performed to determine the construct validity. For criterion validity, academic achievement scales developed by the researchers were used. Reliability studies of the scale were conducted based on the test-retest and test halving method. The Cronbach Alpha coefficient was calculated for all subscales of the scale. It was found that these values varied between .69 and .85 for the first trial, between .66 and .84 for the second trial, and between .68 and .99 for the main application. Pearson Product Moment Correlation Coefficient was calculated for test-retest reliability of the scale. Accordingly, the values obtained vary between .41 and .83 and are significant at the .01 level. Their findings show that the scale is a valid and reliable scale to determine the working memory performance of children in the 5-10 age group.

Measurement Tools to be Used to Determine the Social Validity of the Study

Semi-Structured Interview Forms for Children, Teachers and Parents to Evaluate the Early Intervention Program for Improving Working Memory: These form was prepared by the researcher in order to obtain the opinions of the children, teachers and parents of the children participating in the study of the intervention program and the effects of the program on children in order to ensure the social validity of the study.

Data Collection Process

The data collection process of the study was carried out in three stages: determining the gifted children, determining the effectiveness of the experimental study and determining the social validity of the study. The first of the data

collection tools used in the process of determining gifted children, which is the first stage, is a measurement tool completed by teachers. The other two data collection tools provide measurement by making one-to-one application. The data collection process for the first stage proceeded as follows:

- A seminar on "giftedness, identification and characteristics of gifted individuals in the pre-school period" was given to the teachers in the determined institutions.
- Teachers nominated "gifted" and "typically developing" children by using the "Candidate Notification Scale for Preschool Gifted Children."
- "Raven's Color Progressive Matrices Test" and "Early Literacy Scale" were applied individually by the researcher to the children determined as potentially gifted in order to determine their verbal skills.

The second data collection process was carried out at the beginning and at the end of the experimental study (pre-test-post-test) by applying a scale to determine working memory performance. In order to start the experimental process in the study, it is necessary to determine the gifted children in the experimental and control groups. After the determination of these groups, the "Working Memory Scale" was applied to the children who would be in the experimental and control groups before and after the experiment, one-on-one application by the researcher. In order to ensure the social validity of the study, each student, teacher and parent was interviewed using the semi structured interview forms.

Implementation Process

Preparing an Early Intervention Program for Improving Working Memory

The Early Intervention Program for Improving Working Memory has been developed by benefiting from intervention studies conducted to support and improve the working memory performance of preschool children. The aim of the program is to support and improve children's working memory performances through activities prepared in accordance with the cognitive development levels of preschool children. The program to be developed within the scope of this study is planned as 2 sessions per week for 8 weeks.

In the first stage of the curriculum development process, the literature on the development of preschool period and working memory was examined. After the analysis, the main aims and gains of the program were determined. Then, the content of the program was determined in line with these gains and indicators. Twenty different activity plans suitable for the content were prepared. The opinions of a program development specialist, a pre-school education specialist and a working memory research specialist were consulted in order to determine the consistency of the program's goal objectives and its suitability for the preschool period. An opinion form was prepared in order to obtain opinions of the program from experts selected from outside the researcher conducting the study. Activities were organized according to feedback from experts. Then, a pilot study was conducted with the relevant age group for each activity in order to have information about the suitability of the activities in the program for the age group, the use of time and the interest of children. In line with the feedback obtained from the pilot application, the program and activities were finalized. The program has a spiral structure and an activity can be applied more than once during the program implementation.

Experimental Process Steps

Experimental procedures were carried out by the researcher who conducted the study in order to ensure the continuity of group dynamics, to create an atmosphere of trust and ensure consistency in the implementation of training activities and plans.

Experimental transactions were carried out 2 days a week in November, December and January 2019. Four activities per week were held, with an average of 2 activities each day. Each activity was applied for an average of 40-60 minutes, including starting and ending exercises. Twenty activities in the program were repeated alternately in line with the interests and needs of the children. Only the beginning and ending performances were obtained from the children in the control group with special abilities and typical development.

Data Analysis

The quantitative data obtained at the beginning and end of the experimental process were analyzed in the SPSS 23.00 package program. The qualitative data obtained as a result of semi-structured interviews, which are additional data of the study, were analyzed using the inductive data analysis technique. In this analysis, the data were transformed into themes and their frequencies and percentages were calculated according to the categories. In addition, the contents of the expressions of children and teachers about the intervention program were examined.

Validity and Reliability of the Study

In order to ensure internal validity, the subjects to be included in the experimental and control groups will be assigned objectively, the duration of the experiment was limited to a period of 8 weeks considering the maturation effect of the subjects, and the data collection process was carried out by a single researcher. Considering that the percentage of students attending public school is higher in order to ensure external validity, the sample was selected from public schools located in different regions of Izmir. It was stated to the subjects that these studies were a part of their training in order not to create an expectation effect on the subjects.

At the end of the study, opinions were taken from the participants, their parents and teachers. The qualitative analysis made here reveals the reliability of the study. In qualitative studies, researchers look at the accuracy of their observations, rather than looking at consistency in behavior. It is very important to analyze and interpret the information received here correctly.

In this study, the researcher is responsible for creating and conducting the study. The researcher took an active role in analyzing and interpreting the data and ensuring the validity and reliability of the research. In particular, in order to ensure the validity and reliability of the research and to conduct it under ethical conditions, the data collection process to identify the subjects and the application of the experimental process and the application of the pre-test / post-test data were completely carried out by the researcher.

Results

Findings Regarding the Pretest Scores of Children with Typical Development and Gifted in Experimental and Control Groups

Table 2

Pretest Scores of Typically Developing Children and Gifted Children in the Experimental and Control Groups: Mann Whitney U Test Analysis

Experimental Group		N	M	Sd.	Z	p	r
Verbal Working Memory	Gifted Children	17	347.05	41.70	-4.17	.00	-0,726
	Typically Developing Children	16					
Visual Working Memory	Gifted Children	17	510.85	70.24	-4.73	.00	-0.82
	Typically Developing Children	16					
Control Group		N	M	Sd.	Z	p	r
Verbal Working Memory	Gifted Children	17	347.05	41.70	-4.81	.000	-0.82
	Typically Developing Children	17					
Visual Working Memory	Gifted Children	17	510.85	70.24	-4.97	.00	-0.85
	Typically Developing Children	17					

*p<.05

In order to determine whether there is a significant difference between the pre-test scores of gifted children and typical development in the experimental group and the control group, the "Mann Whitney U Test," one of the non-parametric tests, was conducted. The findings obtained are presented in Table 2 in detail. This difference was found to be in favor of gifted children for both verbal working memory and visual working memory pre-test scores.

Findings Regarding the Pre-Test Scores of Gifted Children in the Experimental and Control Groups

In order to determine whether there is a significant difference between the pre-test scores of the gifted children in the experimental and control groups, the "Mann Whitney U Test," one of the non-parametric tests, was conducted. The obtained findings are presented in Table 3 in detail. Accordingly, it was observed that the working memory performances of gifted children in the experimental and control groups were similar before the experimental process.

Table 3

Pretest Scores of Gifted Children in the Experimental and Control Groups: Mann Whitney U Test Analysis

	Working Group	n	M	Sd.	Z	p	r
Verbal Working Memory	Experimental Group Gifted	17	347.05	41.70	-.343	.731	-0.05
	Control Group Gifted	17					
Visual Working Memory	Experimental Group Gifted	17	510.85	70.24	-1.38	.167	-0.23
	Control Group Gifted	17					

*p<.05

Findings Regarding the Difference Between the Post-Test Scores of Gifted Children in the Experimental and Control Groups

In order to determine whether there is a significant difference between the post-test scores of the gifted children in the experimental and control groups, the "Mann Whitney U Test," one of the non-parametric tests, was conducted. The findings obtained are presented in Table 4 in detail. The difference was found in favor of the children in the experimental group for both verbal working memory and visual working memory post-test scores.

Table 4

Working Memory Performance Post-test Scores of Gifted Children in the Experimental and Control Groups: Mann Whitney U Test Analysis

Working Group		n	M	Sd.	Z	p	r
Verbal Working Memory	Experimental Group Gifted	17	393.05	66.54	-5.05	.000	-0.86
	Control Group Gifted	17					
Visual Working Memory	Experimental Group Gifted	17	575.34	103.69	-4.77	.000	-0.81
	Control Group Gifted	17					

*p<.05

Findings Related to the Difference Between Pre-Test Post-Test Scores of Gifted Children in the Experimental Group

In order to determine whether there is a significant difference between the pre-test post-test scores of the gifted children in the experimental group, one of the non-parametric tests, "Wilcoxon Test" was conducted. The findings obtained are presented in Table 5 in detail. Accordingly, it is seen that the working memory performance of specially gifted children in the experimental group increased significantly after the experimental procedure.

Table 5

Working Memory Pre-Test Post-Test Scores of Gifted Children in Preschool Period in the Experimental Group: Wilcoxon Test Analysis

Experimental Group		n	M	St.	Z	p
Verbal Working Memory	Negative Rank	17	.00	.00	-3.63	.000
	Positive Rank	17	9	153		
Visual Working Memory	Negative Rank	17	.00	.00	-3.53	.000
	Positive Rank	17	8.50	.136		

*p<.05

Findings Regarding the Difference Between the Post-test and Follow-up Test Scores of Gifted Children in the Experimental Group

The "Wilcoxon Test," one of the non-parametric tests, was conducted to determine whether there was a significant difference between the post-test and follow-up test scores of special children in the experimental group. The findings obtained are presented in Table 6 in detail.

Table 6.

Working Memory Performance Post-test and Follow-up Test Scores of Gifted Children in the Experimental Group: Wilcoxon Test Analysis

Experimental Group		n	M	St.	Z	p
Verbal Working Memory	Negative Rank	17	3.50	7	-.136	.892
	Positive Rank	17	2.67	8		
Visual Working Memory	Negative Rank	17	1	1	-	.276
	Positive Rank	17	2.50	5	1.08	

Pre-Test Scores Findings of Typical Development Children in Experimental and Control Groups

In order to determine whether there is a significant difference between the pre-test scores of typical developmental children in the experimental and control groups, the "Mann Whitney U Test," one of the non-parametric tests, was conducted. The findings obtained are presented in Table 7 in detail. Accordingly, it was observed that the working memory performances of the children with typical development in the experimental and control groups were similar before the experimental procedure.

Table 7

Pre-Test Scores of Typical Development Children in Experimental and Control Groups: Mann Whitney U Test Analysis

	Working Group	n	M	Sd.	Z	p	r
Verbal Working Memory	Experimental Group Children with Typical Development	16	347.05	41.70	-.966	.334	-0.16
	Control Group Children with Typical Development	17					
Visual Working Memory	Experimental Group Children with Typical Development	16	510.85	70.24	-2.01	.344	-0.35
	Control Group Children with Typical Development	17					

*p< .05

Findings Regarding the Difference Between Post-Test Scores of Children with Typical Development in the Experimental and Control Groups

In order to determine whether there is a significant difference between the post-test scores of the children with typical development in the experimental and control groups, the "Mann Whitney U Test," one of the nonparametric tests, was conducted. The findings obtained are presented in Table 8 in detail. The difference was found in favor of the children in the experimental group for both verbal working memory and visual working memory post-test scores.

Table 8

Post-Test Scores of Children with Typical Development in Experimental and Control Groups: Mann Whitney U Test Analysis

	Working Group	n	M	Sd.	Z	p	r
Verbal Working Memory	Experimental Group Children with Typical Development	16	393.05	66.54	-5.04	.000	-0.87
	Control Group Children with Typical Development	17					
Visual Working Memory	Experimental Group Children with Typical Development	16	575.34	10.69	-5.16	.000	-0.89
	Control Group Children with Typical Development	17					

*p< .05

Findings Regarding the Difference Between Pre-Test and Post-Test Scores of Children with Typical Development in the Experimental Group

The "Wilcoxon Test," one of the nonparametric tests, was conducted to determine whether there was a significant difference between the pre-test post-test scores of the children in the experimental group with typical development. The findings obtained are presented in Table 9 in detail. Accordingly, it is seen that the working memory performance of the children in the experimental group with typical development increased significantly after the experimental procedure.

Table 9

Pretest-Posttest Scores of Typically Developing Children in the Experimental Group: Wilcoxon Test Analysis

Experimental Group		n	M	St.	Z	p
Verbal Working Memory	Negative Rank	16	.00	.00	-3.41	.001
	Positive Rank	16	8.00	120		
Visual Working Memory	Negative Rank	16	.00	.00	-3.50	.000
	Positive Rank	16	8.00	120		

*p< .05

Findings Regarding the Difference Between Posttest and Follow-up Test Scores of Children with Typical Development in the Experimental Group

The "Wilcoxon Test," one of the nonparametric tests, was conducted to determine whether there was a significant difference between the post-test and follow-up test scores of the children in the experimental group with typical development. The findings obtained are presented in Table 10 in detail.

Table 10

Posttest and Follow-up Test Scores of the Children with Typical Development in the Experimental Group: Wilcoxon Test Analysis

Experimental Group		n	M	St.	Z	p
Verbal Working Memory	Negative Rank	16	1	1	-1.47	.141
	Positive Rank	16	3	9		
Visual Working Memory	Negative Rank	16	.00	.00	-1	.317
	Positive Rank	16	1	1		

*p< .05

Findings Regarding the Views of the Children in the Experimental Group About the Program

After analyzing the answers given to the interview questions with specially gifted and typically developing children in the experimental group, they were examined by two researchers and collected under themes and categories. Answers to questions 1, 3, 7 and 8 are categorized as "positive" and "negative," while Question 2 is "same " and "different," Question 4 is a "favorite activity," Question 5 is "difficult," "easy" and "both difficult and easy," and Question 6 is "the most difficult activity." According to the data obtained, 96.96% of the emotions felt while participating in the activities were found to be positive. It was observed that the children expressing positive opinions expressed these views as "Happy," "Excited," "Beautiful," "Curious," "Enthusiastic," "As if to learn something new.," "Beautiful" and "Good." It was seen that 3.04% of the children expressed negative opinions and expressed this opinion as "boring."

When the data obtained are examined, it is seen that 96.96% of the children stated that the activities carried out under this program are different from the activities carried out in the classroom. Children expressing their opinions in this direction *say "These are not boring at all.,"* "There are object games here.," "*For example, our teacher doesn't ask us questions like you.*," "*Those here are for information*.," "*For example, we do different things here*." and "*It's like it's just developing my brain. I remember everything when I got home.*" expressed on the form % 3.04 of the children stated that the activities were similar.

The activities were "easy" for 84.84% of the children. The children who expressed their opinions in this direction said "Because I could do it all. "and "We had a lot of fun doing it. "expressed on the form. Some 15.16% of the children stated that the activities were difficult. Children who expressed their opinions in this direction expressed their views on the form.

When the data obtained were examined, the favorite activities of the children were "None (3.03%)," "Remembering Movements (6.06%)," "Stamps (6.06%)," "Tangram (6.06%)," "I Prepare My Suitcase (12.12%)," "Remembering Pictures (15.15%)", "All (21.21%)" and "Counting Numbers (30.03%) ." When the views of the children were examined, the activities they had the most difficulties were, respectively, "None (48.48%)," "Remembering Pictures (24.24%)" and "Counting Numbers (3.03%)."

Findings Regarding the Views of the Parents of the Children in the Experimental Group about the Program

After analyzing the answers given to the interview questions with the parents of the children with special talents and typical development in the experimental group, they were examined by two researchers and gathered under six themes. These themes are as follows: "Willingness to Participate in Activities," "Children's Expressions," "Observed Differences," "Finding the Activities Useful," "Continuity of the Program" and "Satisfaction with the Provision of Support Education."

When the data obtained were examined, all parents expressed positive opinions on the themes of "Children's Expressions", "The Situation of the Activities Useful", "Continuity of the Program" and "Satisfaction with the Provision of Support Education", it is seen that 93.93% of the parents in the theme "Willingness to Participate in Activities" and 96.96% of the parents in the theme "Observed Differences" gave positive opinions. is seen that 96.96% of the parents stated positive opinions in the contact.

Parents who gave positive opinions on the theme of "Willingness to Participate in Activities" stated their opinions: "*They are aware that he does different activities, which makes us happy*," "*Because having different friends in the workshop made him*

very happy to have puzzles," "*Because it was a lot of fun*," "*He was very happy with the activities that included educational games*," "*There are activities that interest my child,*" and "*Because my child says he's having so much fun and feels his brain is developing.*" "*My child did not want to quit the activity in the classroom, as the activities were held parallel to the lesson hours,*" expressed on the form.

Parents who gave positive opinions on the theme of "Expressions of Children" stated their opinions, "*They said that they made intelligence-enhancing applications in the activities*," "*They told about the activities they did and that they went very well*," "*They told that they played some games with shapes and drawings in a limited time and it was very entertaining*," and "*He said he does memory and retention activities,*" expressed on the form.

Parents who gave positive opinions on the "Observed Differences" theme stated: "*There was a noticeable improvement in focusing attention, reasoning skills, short-term memory processing and such skills. We noticed improvement in expressive and receptive language skills. Self-confidence increased and individual group work skills increased*." "*I noticed that my child made progress in using his memory, remembering verbal and visual stimuli, and managing instructions*." "*My child was good at drawing. But in this process, he brought movement and dimension to his drawings. He was able to convey what was said in detail in the future,"* and "His memory is very good. *Epecially after learning about this situation, I learned that he can keep a lot of things in his memory*," "*I did not notice much change*."

Parents who gave a positive opinion on the theme of "The Situation of Finding the Activities Useful," and their opinions "*I think it is useful. Its development was supported by groups and individual studies that developed self-discipline. I think it contributes to the child's view from a different perspective. Mental exercises were done with enjoyable games, which enabled them to both learn and have fun." "My child is a child who loves mental development activities. I think it is good for him." "Because I observed that my child developed cognitively*." "*I think it contributed to the mental and visual development of my child.*" "*In this way, my child was able to develop his potential,*" and "*I think such an application enables our children to reveal or even increase their potential in a process where stimuli are so important for children*."

Parents who gave positive opinions on the theme of "Continuity of the Program" said, "*We care about the continuation of the program. We believe that activities that will improve the ability to ask questions and increase the power of interpretation that will encourage them to think will be very useful,"* "*If my child has a talent that we do not know, it will be good for his development and development*," "*Continuity in the activities carried out to develop the existing potential of children. I think it is necessary,*" "*Since there is no standard education and it will add a different perspective, it should continue,*" "*For my child to develop different perspectives on situations and events*," and "*I think that such activities in preschool period improve their cognitive skills before academic skills*," expressed on the form.

Parents who gave a positive opinion on the theme of "Satisfaction with the Providing of Support Education" said, "I *think that the necessary support should be provided to realize and develop each child's potential. Such practices are very beneficial for* us," "*Due to the development of our child's awareness, we started thinking about what we can do as parents,*" and "*Because I think it is very effective in discovering and developing children's special abilities*," expressed on the form.

Findings Regarding the Views of the Teachers of the Children in the Experimental Group About the Program

After analyzing the answers given to the interview questions with the teachers of gifted and typically developing children in the experimental group, they were analyzed by two researchers and gathered under five themes. These themes are as follows: "Observed Differences," "Children's Expressions," "Observed Changes," "Continuity of the Program," "Satisfaction with the Provision of Supplementary Education."

When the data obtained were examined, it was seen that the teachers gave positive opinions on all themes. Teachers who gave positive opinions on the "Observed Differences" theme: "*I observed that they were more active in the attention and visual memory studies we carried out in the classroom*," "*I observed that they were willing to participate in practices*," "*I observed that they expressed themselves better and their self-confidence was positively affected*," and "*I observed that the attention span was prolonged, especially in desk activities,*" they expressed on the form.

Teachers who gave positive opinions on the theme of "Children's Expressions" stated their views: "*They stated that the activities were enjoyable and they were happy during the activities*," "*They said that they did mental and visual studies,*" and "*They stated that the activities were appropriate for their interests and that they participated willingly,*" they expressed on the form.

Teachers who gave positive opinions on the "Observed Changes" theme stated their views: "*I observed that their attention spans increased and their awareness increased,*" and "*By working with different teachers, it enabled them to adapt to different environments and to communicate better with their group mates,*" they expressed on the form.

Teachers who gave positive opinions on the theme of "Continuity of the Program" said: "*I think that conditions suitable for the special abilities of such students should be provided*," "*I think it has a great contribution to the development of children*," and "*Because it helped to close the gap in crowded groups because we did not care about children,"* they expressed on the form.

Teachers who gave positive opinions on the theme of "Satisfaction with the Providing of Support Education" said: "*Although we try to apply different studies to these students, it is not very appropriate for us to do this with other friends in the classroom. Therefore, I think it is necessary to support their special abilities by using a different environment and materials suitable for them," "I think that especially gifted children use their potential at the highest level because they receive a different education from their peers*," and "*It eliminated my anxiety of not being able to keep up with our special children,"* they expressed on the form.

Discussion and Conclusion

According to the findings, it can be concluded briefly below;

- It was observed that there was a significant difference between the pre-test scores of the children with typical development and gifted in the experimental group and the control group, and this difference was in favor of children with gifted children for both verbal and visual working memory in both groups.
- It was observed that there was no significant difference between the pre-test scores of the gifted children in the experimental and control groups.
- It was observed that there was a significant difference between the post-test scores of the gifted children in the experimental and control groups and this difference was in favor of the gifted children in the experimental group.
- It has been observed that there was a significant difference in favor of the post-test scores between the pre-test and post-test scores of the gifted children in the experimental group.
- It was observed that there was no significant difference between the post-test and follow-up test scores of the gifted children in the experimental group.
- It was observed that there was no significant difference between the pre-test scores of the children with typical development in the experimental and control groups.
- It has been observed that there is a significant difference between the post-test scores of the children with typical development in the experimental and control groups, and this difference is in favor of the children in the experimental group.
- It has been observed that there is a significant difference in favor of the post-test scores between the pre-test and post-test scores of the children in the experimental group with typical development.
- It was observed that there was no significant difference between the post-test and follow-up test scores of the children in the experimental group with typical development.
- The early intervention program for improving working memory is found useful by the students participating in the study and their parents and teachers, and ensures social validity.

The first result of the study is that there is a significant difference between the pre-test scores of the typically developing and gifted children in the experimental and control groups, and this difference is in favor of specially gifted children for both verbal and visual working memory. In the study conducted by Conway, Kane and Engle (2003), the relationship between working memory capacity and intelligence was examined, and in previous studies, it was stated that working memory capacity could form the basis of Spearman's g factor theory. Similarly, in the study conducted by Jaušovec and Jaušovec (2012) with adults, 30 hours of training was given to examine the effect of training on working memory on the fluent intelligence of the participants. After this training, it was revealed that the performance of the participants in all fluent intelligence tests increased significantly. In another study, Kane, Hambrick, and Conway (2005) aimed to reveal the relationship between working memory and fluent intelligence. In the study, it was stated that Ackerman, Beier and Boyle (2005), who have done research on this subject, agree that working memory capacity is not synonymous with general fluent intelligence (Gf) or reasoning ability. However, considering the results of the hidden variables studies, Ackerman et al. (2005) has been stated to be more strongly related than shown. These researchers re-analyzed 14 data sets obtained from 10 published studies with more than 3,100 young adults and found a strong relationship between working memory capacity and fluent intelligence reasoning factors (median r.72). In a study by Harrison, Shipstead, Hicks, Hambrick, Redick, and Engle (2013), it was stated that working memory is a critical element of complex cognition, especially under conditions of distraction and interference. However, it has been stated that working memory capacity is positively associated with many measures of cognition, including fluent intelligence. In a study conducted by Alp and Özdemir (2007), the relationship between fluent intelligence and information processing speed, short-term memory and working memory capacity in children was examined. In the study, seven information processing speed tests at different complexity levels, the linear and inverse sequence tests and the Nonverbal part of the Cognitive Abilities Test were applied to 68 first-grade students. The data obtained

showed that when evaluated together with the contributions of independent variables, working memory capacity predicted fluent intelligence. In a study by Bildiren, Korkmaz, and Demiral (2017), the aim was to determine the relationships between executive functions and intelligence in children with special abilities. Wisconsin Card Sorting Test (WCST) and WISC-R were used to collect data in the study. As a result of the findings obtained from the research, it was revealed that there is a relationship between WISC-R Verbal IQ in the range of 114-130, there is no common relationship between Performance IQ and WCST, and there is a significant difference between WCST sub-dimensions by age in children with special abilities. When this result of the study is examined, it is seen that it is parallel with the research findings in the literature.

The second and sixth results of the study are parallel to each other. It was observed that there was no significant difference between the gifted children in the experimental and control groups and the pre-test scores showing typical development. In the study in which Melby-Lervåg and Hulme (2013) put forward the methodological requirements of a suitable study aiming to show the effects of training on working memory performance, it was stated that one of the requirements was that the working memory capacity of the groups included in the experiment before the experiment was equivalent. In this direction, these two results obtained from the study show that the methodological requirements of the experiment have been fulfilled.

In the third and seventh results of the study, it is seen that there is a significant difference between the working memory performances of children with gifted and typical development in the experimental and control groups, and this difference is in favor of the children in the experimental group. In addition, the fifth and ninth results of the study show that there is a significant difference in favor of the post-test scores between the working memory pre-test post-test scores of both typically developing and gifted children in the experimental group. Thorell et al. (2009), preschool children were given computer-based visual spatial working memory or inhibition training for 5 weeks. While one group in the experimental group received computer-based visual spatial working memory training, the other group received computer-based inhibition training. While the active control group was playing commercially-sold computer games during the experiment, the data were obtained from the passive control group in the pre-test and post-test. In line with the findings obtained from the study, it was observed that children who received working memory training significantly improved in the tasks worked during the training. In another study by Kroesbergen et al. (2014), the relationship between working memory and early arithmetic skills was examined. The study was conducted with 51 children in the pre-school trial. In the study, there were 3 different groups, including only working memory training, working memory and early arithmetic skills training, and not benefiting from training at all. In the four-week study, 8 sessions of 30 minutes each were applied to the participants. The difference between the content of the education given to children who have only working memory training, working memory and early arithmetic skills training is planned as one application is numerical and the other is not. According to the findings obtained from the pre- and post-test data of the study, the working memory and early arithmetic skills of all children who benefited from the education programs were significantly improved. Similarly, in the study by Passolunghi and Costa (2016), working memory and early arithmetic skills were also studied. The findings obtained after the experiment showed that while early arithmetic skills training only improved arithmetic skills, working memory training improved both working memory and early arithmetic skills. These findings highlighted the importance of implementing programs aimed at improving working memory in addition to activities aimed at developing specific skills in the preschool period. Diamond et al. (2007), conducted another study with 147 children in pre-school period, a program that supports or does not support executive functions but has the same content was applied to two different groups. According to the results obtained from the study, while there was no significant difference between the participants on the Dot Task, which predicted the executive functions relatively little, it was observed that children who received executive function-supported education performed significantly higher in the Flanker task, where executive functions were at the forefront. Despite studies showing that the preschool period is early for the development of executive functions, including working memory, this study revealed that the specified functions can be improved at the age of 4-5. Röthlisberger, Neuenschwander, Cimeli, Michel, and Roebers (2012) examined the effect of the preschool program, which focused on working memory, intervention control and cognitive flexibility, on children's executive functions. The results obtained from the study revealed that this intervention supports the acquisition of all three components of executive functions: working memory, control of intervention and cognitive flexibility. These results in the literature show that working memory training can have important effects on preschool children. In addition to these results, the information obtained from parents, teachers and children shows that the study is effective in the social validity findings of the study. In this direction, the findings obtained from this study are in parallel with the findings in the literature. In the previous literature in this study, studies showing that working memory training is effective and that

working memory performance is measured higher after training (Thorell et al. 2009; Kroesbergen et al. 2014; Passolunghi & Costa, 2016; Diamond et al. 2007; Röthlisberger et al. 2012) parallels this finding of the study.

The fifth and ninth result of the study is that there is no significant difference between the post-test and follow-up test scores of both typically developing and gifted children in the experimental group. According to this result, it is seen that the early intervention program aimed at improving the working memory not only improves the performance of the working memory but also makes this development permanent.

The final result of the study, in line with the opinions obtained after the experiment, it is seen that the early intervention program was found useful by the students participating in the study, their parents and teachers, and the research provided social validity. Evaluating social validity findings in experimental studies aims to determine whether educational programs are sustainable (Schwartz & Baer, 1991). The information obtained from the social validity data shows that children participate in the activities without difficulty, with joy and with fun. However, it is observed that children find these activities different and they want them to be done in their own class. When the information obtained from the parents, which is an important factor of the study, is examined, it is seen that their children are very eager to participate in the activities, they always describe the activities positively, they see positive differences, find the activities useful, they want the program to continue, and they are very satisfied with such supportive education. Similarly, when the expressions of the teachers are examined, it is seen that they observe positive differences in children, that the statements of the children about the program are always positive, that the continuity of the program is very beneficial for them and the children, and they state that such supportive education should continue. The data obtained in this direction show that the education program developed within the scope of the research is a sustainable program with high social validity.

Recommendations

According to the findings and results obtained from the research, the following recommendations have been developed:

- Increasing scientific studies for gifted individuals in pre-school period and their education,
- Establishing and implementing more early intervention programs for gifted individuals in pre-school period,
- Including activities to improve working memory in early intervention programs for gifted individuals in pre-school period,
- Organizing in-service trainings for preschool teachers, including activities for improving working memory,
- Organizing in-service training for preschool teachers on the characteristics and education of gifted children in pre-school period,
- Conducting studies to examine the effects of intervention programs to improve working memory performance on other skills,
- Conducting longitudinal studies examining the effect of early intervention programs for gifted children in preschool period,
- Establishing different early intervention programs for gifted children in pre-school period and investigating the difference between the effects of these programs,
- It is recommended to ensure that all gifted children in pre-school period benefit from early intervention education.

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