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Aims & Scope

Traditionally, it is seen that change and transformation in the field of social sciences and education takes a little more time compared to fields such as health, technology and engineering. However, this situation seems to have started to change with the Covid-19 epidemic disease. It is expected that changes will occur in human and social behavior during and after the Covid 19 epidemic disease. These changes have started to show themselves in many fields related to social sciences, especially education, psychology, sociology and economy. For this reason, this conference focused on the changes and innovations in the field of social sciences that started with Covid 19. However, the organizing committee also recognizes the value of traditional knowledge in the social sciences and education. For this reason, the conference is also open to traditional studies in the field of social sciences and education.

The aim of the conference is to bring together researchers and administrators from different countries, and to discuss theoretical and practical issues in all fields of social sciences and education. At the same time, it is aimed to enable the conference participants to share the changes and developments in the field of social sciences with their colleagues.

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Synthesizing Social Constructivism and Cybergogy for Student Engagement in Open Distance and e-Learning (ODeL) Environments: An Integrative Review and Framework

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Abstract: This paper synthesizes and integrates the concepts of social constructivism theory and the cybergogy framework to provide a comprehensive understanding of technology use to enhance student engagement in open distance and e-learning (ODeL) contexts. To meet this objective, we conducted an integrative review of the literature to map the conceptual terrain of current literature on student engagement in ODeL environments. The literature search was conducted across five databases, and themes were extracted from the literature to provide new perspectives and insights on student engagement in ODeL. The study underscores the role of facilitating technologies in ODeL. We found that student engagement in ODeL depends on developing an active digital pedagogy that promotes student empowerment and a sense of agency to apply digital tools to interact, collaborate, and enable purposefulness in the learning process. The findings also suggest that academic instructors require institutional support through training and continuous professional development to effectively utilize digital technologies to enhance student engagement. Additionally, ODeL institutions should be aware of the hidden workload impact on instructors that implementing active digital pedagogies for student engagement has. Therefore, instructors also require support with workload management interventions. Based on these findings, we develop a conceptual framework for engaged learning in ODeL environments.

Keywords: Student engagement, Social constructivism, Cybergogy, Digital pedagogy, Open distance and e-learning (ODeL)

Introduction

One of the most often mentioned features of open, distance, and e-learning (ODeL) educational environments, also referred to as distance education, is the geographical distance between students and the institution. The distance is not only geographical, with students being physically separated from the institution (Bates, 2019), but it is also a transactional distance, a perceived psychological and social gap between the student and the institution (Moore, 2019). This physical and psycho-social distance creates a sense of isolation, alienation, and disengagement for students, which impacts learning outcomes (Schoeman, 2021). The challenges in ODeL environments negatively affect ODeL institutions and their students. Resultingly, ODeL environments are characterized by higher attrition rates, lower throughput rates, lower performance, and lower interactivity and engagement rates (Bolliger & Martin, 2018).

Student engagement is a multifaceted concept broadly defined as the degree of commitment and involvement students invest in their educational pursuits (Yates et al., 2014). This commitment manifests in various ways, including observable behaviors (such as effort, attendance, and positive conduct), cognitive behaviors (including purposefulness, critical thinking, and self-regulation), or affective behaviors (like enthusiasm, interest, and enjoyment) (Bond et al., 2020). Student engagement has a demonstrated correlation with enhanced student

success rates, reduced attrition rates, and increased throughput rates (Bagriacik Yilmaz & Banyard, 2020). It is, therefore, in the best interests of the ODeL institutions to find viable approaches to foster and enhance student engagement.

Use of Technology in ODeL

ODeL education is often lauded for its inclusivity. ODeL offers access to education to students from previously disadvantaged backgrounds, students of different abilities, and students who might not be able to access education full-time, such as mature and working students (Ngubane-Mokiwa, 2017). To enable access, ODeL institutions often heavily leverage technological tools and innovations to deliver teaching and learning that is flexible and at a distance.

Technological tools and innovations are ubiquitous in higher education in the Fourth Industrial Revolution (4IR) era. The education literature substantiates using technology to enhance learning outcomes (Pickering & Swinnerton, 2019). However, despite the widespread adoption of technology, Ng and Lo (2023) argue that student engagement in online education is one of the aspects of the educational experience that has seemingly not benefitted from increased technology use in education. While ODeL institutions often invest significantly in technological infrastructure to enhance teaching and learning, these tools often fail to adequately bridge the physical and psycho-social distance between the institution and its students (Isabirye et al., 2017). (Muir et al., 2022) argue that there is a lag in developing pedagogical approaches to enhance student engagement in distance education and online learning.

Digital pedagogies are defined as the use of digital technologies to enhance all aspects of teaching practice, such as teaching, learning, assessment, and curriculum. Väätäjä and Ruokamo (2021) and De Leon (2023) argues that students in the digital age are fundamentally changed by the use and application of new technologies and correspondingly require new and appropriate pedagogies for learning and engagement. Several studies have investigated the use of technological tools to facilitate student engagement in higher education (Bergdahl et al., 2020; Díaz-Noguera et al., 2022). However, the reasons why technological measures fail to enhance student engagement are still poorly understood. Appropriate frameworks that adequately tackle digital pedagogies to support student engagement in ODeL contexts are still missing in the scholarly literature.

This paper aims to integrate the concepts and literature on social constructivism theory and the cybergogy framework to provide a more comprehensive understanding of how digital pedagogies may enhance student engagement in ODeL environments. In doing so, we develop a conceptual framework for student engagement in ODeL. This framework synthesizes existing knowledge and provides a more in-depth understanding of technology use for student engagement in ODeL environments, in general, and also the ODeL context in developing and emerging economy contexts, in particular. The research questions that will be addressed are:

- How can technology use support enhanced student engagement in ODeL environments?
- What should ODeL institutions consider for the successful implementation of digital pedagogies for student engagement in ODeL environments?

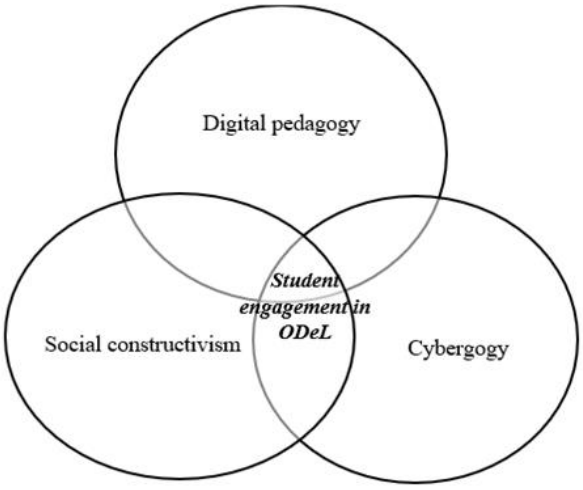

Figure 1. Research focus

The research focus of this paper is at the intersection of ODeL, social constructivism theory, and the cybergogy framework as they relate to student engagement, as highlighted in Figure 1. We synthesize the concepts underpinning social constructivism and cybergogy to develop a conceptual framework that addresses technology use for student engagement in distance education.

The rest of the paper is structured as follows: In the next section, we discuss the methodology of the paper, followed by a presentation of the literature on digital pedagogies, social constructivism theory, and the cybergogy framework as they relate to student engagement in ODeL. In section four, we present and discuss our findings, leading to the development of a conceptual framework for technology use for student engagement in ODeL. In the concluding sections, we discuss possible future work and offer recommendations for practitioners.

Methodology

To address the research questions, we conducted an integrative review of the literature (Tricco et al., 2016) to synthesize evidence on the conceptual terrain of current literature in social constructivism and cybergogy to determine the digital pedagogies that may facilitate student engagement in ODeL environments. By assimilating and combining previously developed concepts and theories, new perspectives and novel insights on student engagement in ODeL were developed (Jaakkola, 2020). Figure 2 shows the steps involved in the methodology of the paper.

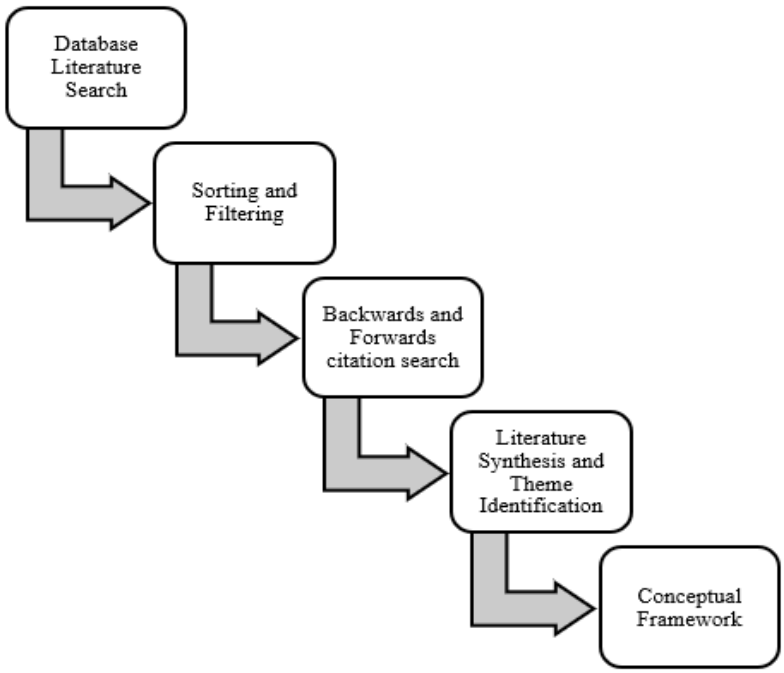

Figure 2. Methodological process

A literature search was conducted across five databases, namely, Education Resources Information Centre (ERIC), African Journals Online (AJOL), ProQuest, EBSCO Information Services, and Web of Science (WoS), using the following keywords: digital pedagogies, online pedagogies, eLearning strategies, student engagement, student participation, open distance, and eLearning, ODeL, distance education, online education, best practices, innovation, social constructivism, and cybergogy. Articles were also found using backward and forward citations on Connected Papers (https://www.connectedpapers.com/). Both conceptual and empirical papers were included in the literature selection.

The articles were sorted to remove duplicate findings. Only studies that addressed digital technology use and student engagement in higher education, that is, undergraduate and postgraduate studies, were included for further review. The articles included in the final review were analyzed for concepts of social constructivism and cybergogy as they relate to student engagement in ODeL and the challenges thereof. Themes were inductively extracted from the selected literature to determine best practices for technology use for student engagement in ODeL environments.

Literature Review

Utilizing the evidence synthesis methods outlined in the Methodology section, concepts underpinning social constructivism theory and the cybergogy framework are used in the development of pertinent themes and to inform the conceptual framework.

Digital Pedagogy and Student Engagement

Digital technologies are increasingly necessary for the effective and efficient delivery of teaching and learning in ODeL. As ODeL institutions continue to leverage technological innovations for teaching and learning, these changes require a corresponding change in instructors' teaching practices. However, several studies have shown that the large-scale implementation of digital infrastructures in distance education does not always yield the intended positive outcomes (Sammel et al., 2014; Isabirye et al., 2017).

Teaching and learning practices that enhance student engagement in ODeL require that instructors continuously evolve how they deliver educational content. Literature highlights the pressing need for faculty and instructors to be supported with the skills and capabilities that enable effective teaching practices in the digital era (Bond et al., 2020; Jarvie-Eggart et al., 2023; Muir et al., 2022; Sammel et al., 2014). Instructors require training and continuous professional development opportunities to adapt their teaching practices to enhance student engagement in ODeL. This finding is supported by a literature review of student engagement in distance education by Bond et al. (2020). Additionally, a study by Jarvie-Eggart et al. (2023) involving faculty at an American university who underwent training in best practices in digital pedagogies self-reported improvements in online teaching instruction capabilities after the training.

Diaz-Noguera et al. (2022) argue that engagement in distance and online contexts goes beyond using a learning management system (LMS). Additionally, Sammel et al. (2014) highlight that while students can usually use the LMS to access course content, often they may not know how to use the LMS beyond this to engage with the institution and other students actively. Lockman & Schirmer (2020) suggest that effective teaching practices in online environments include using online discussion forums, social media applications, and instructor presence. Bigatel and Edel-Malizia (2018) suggest using various technology modalities to communicate, such as synchronous and asynchronous video content and emails, and utilizing various assessment techniques. (Denning et al., 2021) also found text-based group discussions and group projects to enhance student engagement online. Thus, instructors may need to develop digital pedagogies to engage students in ODeL actively.

Social Constructivism and Student Engagement

Social constructivism is the prevailing theory of learning in ODeL (Denning et al., 2021). This theory of learning emphasizes the importance of social interaction for learning to occur and recognizes that students are active collaborators in the learning process (Bates, 2019). However, for this collaboration to occur, quality interaction between the institution and the students is required. Technology is often used to simulate institutional presence in ODeL contexts where learning is from a distance. As such, one of the measures of quality in distance education is the interactivity ratio (Trentin, 2000). From a social constructivist viewpoint, three types of interaction are purported to influence student engagement, namely: student-student, student-instructor, and student-content interaction (Denning et al., 2021; Muir et al., 2022).

Student-Student Interaction

Student-student interaction is essential for student collaboration and exchanging resources and ideas (Bolliger & Martin, 2018). Social constructivism theory emphasizes student collaboration to exchange ideas, share meaning, and foster collaborative problem-solving (Redmond et al., 2018). For example, discussion forums where students engage and exchange ideas have been shown to significantly enhance student engagement in online contexts (Ng & Lo, 2023).

Additionally, student-student interaction in ODeL reduces feelings of isolation among ODeL students and enhances engagement with the institution (Sadeghi, 2019). Alienation from the institution impacts student performance and has been found to have additional unintended outcomes, such as academic misconduct (Fatemi & Saito, 2020).

Student-Instructor Interaction

In a study across several universities in the United States, Martin and Bolliger (2018) found that students value interactions with their instructors above interactions with other students. Instructors are typically more knowledgeable and competent in their subject matter than their students. As the more competent person, instructors can thus guide students to accomplish more and attain higher levels of knowledge through the zone of proximal development (Eun, 2019). The perceived benefits of interaction with instructors likely make student-instructor interactions seem more valuable to students than other interactions.

Research shows that instructor presence on online platforms was a significant predictor of student engagement (Dwivedi et al., 2019). In addition, student interactions with instructors have been found to foster a sense of community and belonging in students (Bolliger and Martin, 2018). However, faculty often resist online activities beyond traditional teaching practices (Khan et al., 2017). This is likely due to resistance to change (Isabirye et al., 2017) and being overwhelmed by other responsibilities to effectively take on new instructional duties (Khan et al., 2017).

Student-Content Interaction

Muir et al. (2022) contend that student-content interaction is the least researched area of student engagement. Additionally, Lawrence et al. (2019) found that student-content interaction had the lowest interactivity rates in online education, which Blackburn (2016) argues is due to the implementation of educational technologies that are not student-centered. Furthermore, students tend to disengage from learning when it is not connected to real-life contexts and activities (Martin & Bolliger, 2018; Milad, 2021). Digital modalities such as simulation and gamification have been found to be useful in enabling a sense of authentic real-life activities in online contexts (Lawrence et al., 2019; Ng & Lo, 2023).

Students nowadays are often thought of as digital natives who prefer digital tools and digital communications (Prensky, 2001). However, this assumption is challenged by several studies that highlight that students often do not have the technological competencies to successfully engage with various learning tools beyond using learning platforms to access learning materials (Bolliger and Martin, 2018; Sammel et al., 2014). In many instances, students must be taught how to effectively use and navigate the various technological tools available to enable active student engagement (Ng & Lo, 2023).

These challenges are exacerbated in developing and emerging economies struggling with infrastructural gaps and socio-economic inequalities (Ge et al., 2019). Students' digital skills have been found to correlate with engagement in online learning (Rajeb et al., 2022). King et al. (2018) assessed the challenges inherent in online learning in the so-called global South. They found that problems related to poor access to information and communication technologies (ICTs) and a lack of digital skills led to poor enrollment rates in freely available massive open online courses (MOOCs).

Rajeb et al. (2022) also point out that students in developing countries resisted forced online learning during the COVID-19 pandemic due to the low technological competencies of students and instructors and a lack of technical assistance from institutions. In the South African context, the challenges of the digital divide, which refers to unequal access to digital technologies (Lembani et al., 2020), persist mainly for poor black South Africans who cannot access digital technologies due to a lack of affordability or lack of supporting infrastructure in certain areas such as rural areas. This has led to vastly different educational experiences for marginalized communities (Lembani et al., 2023; Ngubane-Mokiwa, 2017).

Resultingly, distance education provision needs to be cognizant of the various ways in which students access course material and interact online. This is supported by the concept of cybergogy discussed in the sections below.

Cybergogy and Student Engagement

Scholars highlight that implementing digital technologies in education does not always lead to improved learning outcomes (Isabirye et al., 2017; Sammel et al., 2014). As a result, institutions need to consider various factors to ensure that educational technologies are accessible while taking cognizance of the needs of a diverse pool of students. The cybergogy framework was conceptualized by Wang & Kang (2006) as a way of thinking

about the strategies that enable engaged learning online. Cybergogy is the application of instructional design principles in online and digital learning environments (Nurmalisa et al., 2023).

The cybergogy framework conceptualizes student engagement as a multidimensional construct. It considers three domains of engagement in online education: the cognitive domain, the social domain, and the emotive domain (Wang & Kang, 2006). Similar to social constructivism theory, the theoretical concepts underpinning the cybergogy framework, such as student-centered design, self-regulated learning, collaboration, social interaction in online learning, flexibility, and accessibility, are suggested to facilitate student engagement in distance education (Muresan, 2014; Rahma et al., 2021). The cybergogy framework assumes that technological tools with specific characteristics can be developed to enhance student reflection and collaboration in online settings (Wang & Kang, 2006).

According to Dunn & Kennedy (2019), cognitive engagement refers to the extent to which students are challenged by their course content and mentally invested in it. Rahma et al. (2021) suggest that instructors should develop authentic assessments contextualized to the real world to cognitively engage students in online settings. Bond et al. (2020) suggest incorporating teaching practices that encourage student autonomy and self-regulation.

Social engagement relates to students' personal attributes towards their learning (Wang & Kang, 2006). Other scholars refer to the social engagement dimension as behavioral engagement (Dunn & Kennedy, 2019; Bond et al., 2020). This dimension relates to students' motivation, time, and effort in their educational activities. Muir et al. (2022) suggest that students demonstrate behavioral engagement when instructors give consistent and timely feedback. In a study across several Australian universities, Lawrence et al. (2019) found that setting clear expectations by using course analytics to remind students to prioritize and complete tasks timeously led to behavioral change in students who engaged more successfully with course content on an LMS. According to Dunn & Kennedy (2018), emotional engagement refers to students' positive emotions towards their learning, institution, instructors, and other students. Emotional engagement is greatly enhanced when students feel a sense of belonging to their institution. Emotional engagement is facilitated by learning environments that foster communication and collaboration (Redmond et al., 2018).

ODeL institutions, as the name implies, should be open and inclusive. This relates to providing educational access to students who might, under other circumstances, have been unable to access the institution due to geographic distance time constraints, for example, in the case of working students, disabled students, and students from previously disadvantaged backgrounds (Dalton et al., 2019; Lembani et al., 2020; Ngubane-Mokiwa, 2017). To fulfill the mandate of inclusivity and flexibility, the cybergogy framework suggests ways of instructional design that consider accessibility concerns, such as multi-modal digital tools to engage students with different learning styles and interactivity to facilitate collaboration and enhance the various dimensions of student engagement (Muresan, 2014; Nurmalisa et al., 2023). By applying the principles of cybergogy, educators can create online learning experiences that prioritize student engagement. The student-centered design, active learning strategies, technology integration, collaboration, flexibility, and multimodal approaches evinced by the cybergogy framework provide opportunities for students to be actively involved, motivated, and connected in ODeL.

Findings and Discussion

A comprehensive review and synthesis of the literature on social constructivism and cybergogy as they relate to student engagement in ODeL provided several findings that can be grouped into two main themes: active digital pedagogy and student empowerment. The findings suggest that technology can best be used for student engagement in ODeL by embracing active digital pedagogies. Additionally, to facilitate student engagement in ODeL, technologies and pedagogies that foster student empowerment are required. These findings are presented below.

Active Digital Pedagogy

The literature on teaching and learning in the digital age emphasizes the need for instructors to develop digital pedagogies that enhance learning outcomes in online and distance education (Bolliger and Martin, 2018). As seen from the literature review, many teaching practices have been found to enhance student engagement in ODeL, including discussion forums, online instructor presence, gamification, authentic assessment and feedback

practices, podcasts, etc. (Bigatel & Edel-Malizia, 2018; Denning et al., 2021; Lockman &Schirmer, 2020; Ng & Lo, 2023). As a primary consideration, whatever tools and practices are used for engagement in ODeL should be interactive and emphasize collaboration.

The articles reviewed present compelling cases of the various ways to engage students and the digital pedagogies that facilitate engagement in online and distance learning. Teaching practices should consider that students have different learning styles that may be visual, auditory, or tactile (Lockman &Schirmer, 2020). Visual learners might prefer illustrated learning material, while auditory learners may prefer video lectures or podcasts (Bates, 2019). However, students often present with a combination of various learning styles (Nurmalisa et al., 2023). Therefore, digital pedagogies need to be multimodal. Multimodal digital pedagogies also enhance equitable access to learning content for students with disabilities (Dalton et al., 2019).

Considering the need for student-centered digital teaching practices requires a significant investment in time and effort by instructors. Many instructors will likely be unfamiliar with suitable digital pedagogies, such as gamification, podcasts, online presence, etc., that are deemed to enhance student engagement in ODeL (Khan et al., 2017). The findings from the literature reviewed indicate that many studies on digital pedagogies do not adequately address the concern that instructors are often not adequately capacitated to develop digital teaching practices that may improve student engagement in ODeL settings.

ODeL institutions should consider supporting instructors in acquiring new skills and capabilities to learn new teaching practices that support learning and engagement in ODeL. This finding is supported by a study of American faculty by Jarvie-Eggart et al. (2023), who found that instructors who underwent training in best practices in digital pedagogies self-reported improvements in online instruction capabilities at the completion of training. In addition, a study of Finnish academics by Clavert et al. (2015) concluded that participating in communities of practice was a practical way of promoting pedagogical development among academics.

Additionally, institutions should be mindful of the work pressures on academics to juggle several duties, such as instruction, assessment, research work, committee work, and other responsibilities. (Gregory & Lodge, 2015) note that using new technologies in teaching and learning often significantly adds to academic workloads, and yet, compared to academic research, teaching is undervalued by institutional management. The continuous professional development of staff required by technology-enhanced learning modalities may require that additional time be allocated to instructors for this purpose. Gregory & Lodge (ibid.) argue that the time spent by academics in training and upskilling to implement new digital pedagogies needs to be appropriately incentivized. The authors suggest revisiting institutional policies to address the risks of hidden workload overwhelm necessitated by a shift to digital pedagogies.

Student Empowerment

Another central theme from the literature reviewed is that student engagement in ODeL requires empowering students with a sense of agency to take control of their learning journey. Providing students with flexible and accessible learning modalities allows them to develop a sense of independence and autonomy (Muresan, 2014). It is not a coincidence that many pedagogies suggested for online learning, such as authentic assessments and online instructor presence, empower students with a sense of belonging and agency to self-direct themselves throughout the learning process.

A systematic literature review of student engagement by Bond et al. (2020) notes less published literature on technology-enhanced learning and student engagement from the African context than in other regions. This is true for our literature findings as well. The limited quantity of research content from the African perspective is problematic because the developing nation context differs significantly from the developed nation setting. Students will likely face different experiences and challenges in accessing ODeL education in these different contexts. For example, Lembani et al. (2020) refer to the challenges of a digital divide in South Africa as one of the main concerns relating to inclusion and access to distance education for all. Additionally, a recent report by the University of South Africa (UNISA) on students' perceptions of online examinations in distance education found that during the 2022 academic year, at least 54% of respondents relied on their mobile phones to access and complete their online examinations (UNISA, 2023).

When students cannot access course content or interact and collaborate with instructors and other students, this may demotivate them and disempower them from actively participating in their learning. Not all students will have laptops and high-speed internet access in developing and emerging economy contexts. Digital pedagogies

in ODeL should consider inclusion and access to all students across the economic spectrum for ODeL to maintain its openness. This is echoed by Ngubane-Mokiwa (2017), who argues that a lack of intentionality in developing digital pedagogies contextualized to the developing nation context may eventually lead to the exclusion of marginalized groups in ODeL. Any technology-enhanced teaching practices should emphasize inclusivity and accessibility of content.

Another approach to empower students in ODeL is by enhancing their digital skills. Given the previously discussed digital divide, it is unsurprising that Sub-Saharan Africa and other developing economies suffer from low digital literacy rates (Kerkhoff & Makubuya, 2022). Diaz-Noguera et al. (2022) highlight that for online students to be truly engaged, they need to use educational technologies for more than accessing course material. Students should be able to engage with learning platforms to interact with other students, communicate, and participate in learning activities for enhanced engagement. Bolliger and Martin (2018) argue that the assumption that students are 'digital natives' who can fully utilize digital technologies for active learning should be examined further. Sammel et al. (2014) recommend that students be taught how to use digital technologies and the various ways the LMS can be utilized to develop their technological competencies. Following the synthesis of social constructivism theory and the cybergogy framework, we developed a conceptual framework for engaged learning in ODeL environments, as shown in Figure 3.

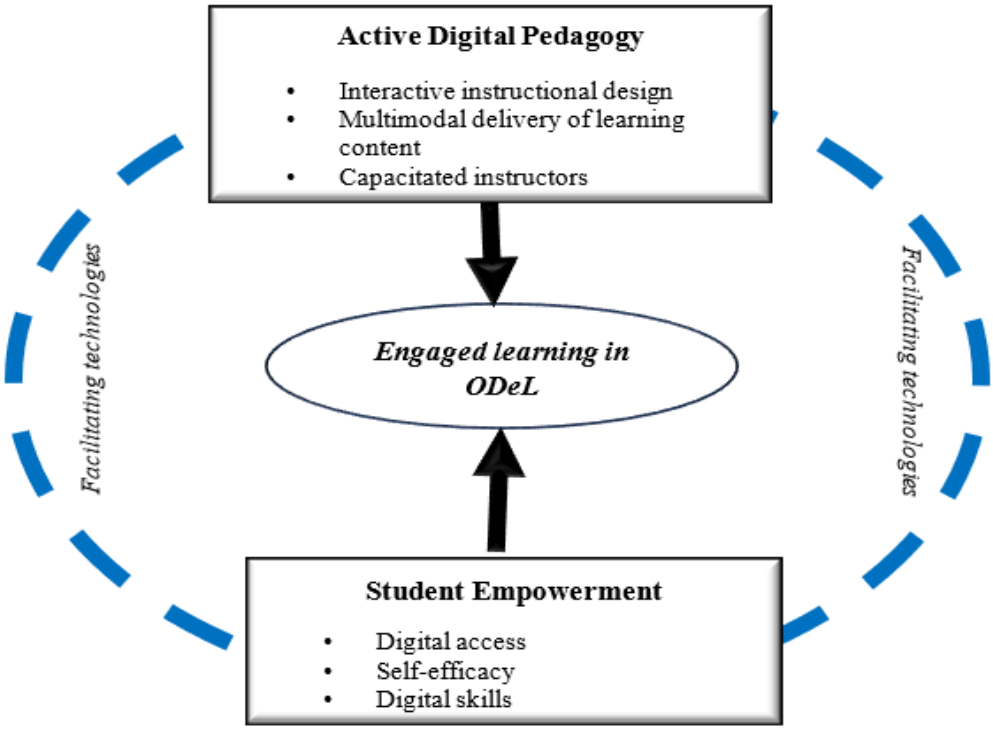

Figure 3. Framework for engaged learning in ODeL environments

The framework for engaged learning in ODeL, presented in Figure 3, highlights that student engagement in ODeL leverages facilitating technologies to develop active digital pedagogies that support student empowerment to allow students to be active co-creators of their learning outcomes. The framework acknowledges that appropriately capacitated instructors with technological capabilities and work capacity can deliver effective digital pedagogies through interactive designs and multimodal delivery to enhance student engagement in ODeL. To have agency over their learning outcomes, ODeL students need to be empowered with digital skills and access to digital tools that enable student engagement. Digital skills and access may give ODeL students the autonomy to shape their learning journey purposively.

While numerous theoretical frameworks and pedagogical approaches can be applied to enhance student engagement in ODeL, we propose that the principles articulated within the realm of social constructivism theory relating to students as co-creators of learning, coupled with the concepts of the cybergogy framework for student-centered technology enhanced instructional design, offer viable solutions for addressing the intricacies of student engagement in ODeL.

Conclusion

This paper conducted an integrative literature review to synthesize the literature on social constructivism and cybergogy for student engagement in ODeL. Literature was sourced across five databases and integrated into a conceptual framework. We proposed a conceptual framework of engaged learning in ODeL contexts to consider appropriate mechanisms to effectively engage students in ODEL using technology-enhanced learning.

This paper's integrative review and conceptual framework suggest future work that could be explored further. A quantitative study to survey students at an ODeL institution can be conducted to determine the specific digital pedagogies that lead to the highest levels of student engagement and autonomy. Future work could also consider frameworks that address the workload challenges of instructors to enable them to use technological tools to develop effective digital pedagogies for effective student engagement in ODeL.

Recommendations

Following the literature review and conceptual framework we have developed, we can offer ODeL institutions and practitioners the following recommendations.

ODeL institutions should emphasize capacitating instructors in digital technology use. In the ever-evolving technological landscape, instructors require training, support, and continuous professional development in digital technology use for student engagement. Several studies have pointed out the effectiveness of online instructor presence in student engagement (Bond et al., 2020; Dwivedi et al., 2019; Lockman and Schirmer, 2020). Therefore, instructor presence on online platforms should be emphasized to encourage student engagement. These said, we recommend that ODeL institutions consider their workload models to address instructors' hidden additional work responsibilities when implementing various technological interventions to address student engagement in ODeL.

Technology is often seen as the panacea to bridge the distance between ODeL institutions and ODeL students. However, inclusive digital pedagogies in ODeL should consider the socio-economic dynamics of the student's context. Therefore, we recommend instructional designs accessible to all types of digital devices to allow access to economically disadvantaged students. ODeL institutions may need to prioritize students' digital competencies by offering digital skills training to empower and enhance student autonomy to take advantage of learning technologies for enhanced student engagement and performance.

We can also recommend the development of communities of practice to enable instructors to share experiences and best practices for student engagement in ODeL contexts. These interactions may generate new knowledge and assist in developing enhanced skills. Our literature search also highlighted that the sub-Saharan African and postgraduate student contexts are under-represented in the literature on student engagement in ODeL environments. It is essential to increase empirical academic literature on student engagement in the sub-Sahara context, as implementing technological interventions in a context where infrastructural challenges and the digital divide are more pronounced would pose unique and contextual challenges. Additionally, postgraduate students face unique challenges in balancing work and family responsibilities. They, therefore, also require context-specific interventions to address the issues they face regarding engagement with the learning journey. We recommend additional research focusing on student engagement in ODeL in the sub-Saharan African context and post-graduate students.

Scientific Ethics Declaration

The authors declare the scientific, ethical, and legal responsibility of this article published in EPESS journal belongs to the authors.

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Community Information Group and Digital Literacy: Phenomenological Approach in KIM Karangbesuki, Malang, Indonesia

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Abstract: This study investigates the variety of programs and the meaning of members of the Community Information Group (CIG) as administrators and contributors to digital literacy. This is related to the CIG event in Karangbesuki subdistrict, which won the local CIG competition named KIM Award 2022 and was selected the best CIG in Malang City, Indonesia. A review of the literature shows that CIG has made a positive contribution to increasing digital literacy in society. Therefore, it is interesting to explore how the main actors interpret programs related to digital literacy. This research is qualitative with Husserl's phenomenological approach, including perception, intentionality, awareness, reality constitution, and intersubjectivity. Data was collected through interviews with administrators and contributors, observation, and documentation. Data analysis was carried out using an interactive model that included data reduction, data presentation, and drawing conclusions. The results showed that KIM Karangbesuki had three programs, namely: social media, citizen coverage, and training. Based on the results of the analysis, it can be concluded that the constitution of reality is the most important phenomenological aspect.

Keywords: Community information group, Digital literacy, Phenomenology

Introduction

Community Information Group (CIG) in Indonesia was established since 2010 based on deed by Indonesian Ministry of Communications and Informatics number: 8/PER/MENKOMINFO/6/2010 concerning Guidelines for the Development and Empowerment of Social Communication Institutions. Increasing the ability of the community to be empowered and live a decent life and be able to overcome problems in the future is the background behind the birth of a CIG named *Kelompok Informasi Masyarakat (*KIM). Therefore, the vision is the realization of innovative KIM in increasing added value for society through the utilization of information and communication to achieve a prosperous information society. Globally, KIM is better known as Community Information Group (CIG) in the scope of Community Information (CI) study. CI is defined as an information group that focuses on society to have the ability and use of information for the survival and growth of society (Chandra, 2022). This shows the close relationship between KIM and literacy, especially digital literacy as a skill that needs to be mastered in the current information era. Digital literacy is an important skill for all people to master. With digital literacy, society could sort information that is healthy, not misleading to be trusted and disseminated (Spires, 2019).

Based on the literature review carried out, the author found that there is a significant positive contribution of CI, or in this case CIG, to digital literacy in society. Several previous studies show that CI can provide significant benefits in increasing digital literacy and technology skills, increasing income and quality of life for rural

communities, as well as providing access to information and business opportunities. As research by Esh and Ghosh (2021), shows that CI in India can increase digital literacy and people's ability to use technology. CI provides access to necessary hardware and software as well as training to improve technology skills. In line, Li et al., (2019) shows that CI connected people's decision between online and offline medical services due to their understanding over digital devices. Lastly, in Indonesia CI was part of digital literacy in a mission to promote local creative businesses in Kulonprogo (Astuti, 2019).

In the context of CIG as a research's topic, some of the latest research regarding the contribution of CIG in society includes: Mukti and Winanta (2021)conducted research related to the contribution of CIG in realizing an information society in urban areas. The study was conducted in Magelang City using a case study approach. The research results show that CIG contributes to disseminating government programs to the community, especially those related to smart cities which are being promoted in the city. Meanwhile, Sunuantari and Gunawan (2021) studied the contribution of CIG to rural communities. They carried out community service in Srijaya Village, Belitang II District, East Ogan Komering Ulu Regency and stated that CIG was a vehicle for disseminating community information. Where this information can be processed according to community needs to provide economic benefits for the community. Apart from that, CIG provides space for the community to convey development ideas. Implicitly, the two studies also indicate the close contribution of KIM to digital literacy.

Considering the strategic position and contribution of CIG in relation to digital literacy in society based on the description of the research results above and the coronation event of KIM Karangbesuki as the best CIG in Malang City, this research interested in conducting further investigations regarding "how the administrators and KIM Karangbesuki contributor to digital literacy?" This is important because they are the main actors who drive the wheels of the organization and carry out various programs, especially those related to digital literacy using a phenomenological approach. The focus and approach used are new in this research.

Specifically, this research aims to answer: (1) what programs were initiated by KIM Karangbesuki? and (2) how do KIM Karangbesuki administrators and contributors interpret programs related to digital literacy? Therefore, this research aims to: (1) identify the contribution or program idea of KIM Karangbesuki which led him to win the KIM Awards; (2) the meaning of administrators and contributors towards digital literacy and their experience in making related programs a success. This research is important because apart from identifying the programs carried out, especially those related to digital literacy, it also reveals the meaning of the administrators and contributors behind them.

Method

This research used qualitative methodology with a phenomenological approach. Those approach refers to the model proposed by Husserl, which consists of: Perception, Intentionality, Consciousness, Constitution of Reality, and Intersubjectivity (Butchart, 2017). The informants were the administrators and contributors of KIM Karangbesuki in Malang City due to their competency for conducting such a community information group. The data collection technique was carried out by conducting interviews with key informants directly, observation, and documenting paper related. The research process was held from March to May 2023. Determination of the sample in this research was carried out using a purposive sampling technique. The indicators determined in this research include: (1) Being the administrator of KIM Karangbesuki; (2) Being the contributor of KIM Karangbesuki for more than 1 year, and (3) Willing to be interviewed. A total of 5 key informants were successfully obtained and participated in the research as shown in Table 1.

Data analysis was held using the interactive model from Miles, Huberman and Saldana (2014) which includes three stages, including: (1) data reduction, (3) data presentation, and (3) drawing conclusions. Finding analysis was conducted by referring to the phenomenological study put forward by Husserl. Furthermore, data source triangulation was carried out in the validation process to ensure the validity of the research data (Creswell, 2017).

Results and Discussion

The data and information presented in the results and discussion of this research come from interviews with five key informants as shown in Table 1, as well as field observations and documentation/literature study.

Table 1. Research informant data

Pseudonym	Gender	Identity	Age
Monica	P	Manager	33
Zahra	P	Manager	24
Bambang	L	Manager	20
Joko	L	Contributor	62
Wati	P	Contributor	54

Source: Research data, processed in 2023.

General Description of KIM Karangbesuki

KIM Karangbesuki is an organization that functions as a mediator, facilitator and catalyst between the community and the community and the community and the government regarding access to local information in the Karangbesuki sub-district area and Malang city. KIM Karangbesuki was inaugurated on February 26, 2020, through a Decree from the Mayor of Malang. The management of KIM Karangbesuki consists of 10 administrators with 13 contributors spread across 10 RWs. There are three main programs from KIM Karangbesuki, namely:

1. Social Media is the organization's main activity in the form of publishing graphic and video content on KIM Karangbesuki's Instagram and Tik Tok.
2. Citizen coverage is a program covering community activities in the Karangbesuki sub-district environment so that it can produce news and articles about community activities.
3. Training is a thematic training program from KIM Karangbesuki in accordance with KIM competencies such as digital literacy training, citizen journalism, use of social media, searching for good news or information sources, etc.

KIM Karangbesuki's Perception of Digital Literacy

The brief knowledge about digital literacy by KIM Karangbesuki contributors and administrators seems to be uniformly even though they have not yet grasped the entire concept of digital literacy. The main basis is the existence of anti-hoax outreach activities carried out in collaboration with KIM with Karangbesuki Village and Communication and Information Beurau of Malang City. KIM Karangbesuki knows that digital literacy is a person's effort to protect themselves against misinformation on the internet. Key informants confirmed that memories regarding the training activities were actually connected with other digital knowledge, such as by showing their skills in confirming each message they received. For example, the resource person reviews the researcher's profile as a consideration for accepting the requestas a research resource. The following are the results of interviews with the relevant management.

"…as far as I remember, the material (digital literacy training) was about how KIM can avoid hoaxes when disseminating information. So because KIM is a source of information from citizens and those who process it, our citizens are also given education on how to choose the right information that we can know too."

This statement is in accordance with the current condition of digital literacy in Indonesia which focuses on handling hoax information by Irwanto et al (2020). Indonesian people are familiar with the use of the internet and can use it well, however the issue of hoax information is part of digital literacy education which must be emphasized first to the community (Irwanto et al., 2020).

Through key informants, it can also be seen that KIM Karangbesuki knows that digital literacy includes a series of activities for a person to use technology to interact digitally. It programs and activities utilize the use of technology to achieve wider connections with citizens digitally such as social media, WhatsApp groups, and also virtual meetings via Zoom. The resource person gave this presentation with full confidence. The source further claimed that KIM Karangbesuki was digitally literate. As seen in the results of interviews with the management:

"Yes, I feel like that because since the formation of KIM, everything requires technology. I only joined at the end of 2020, when Covid came and everything was locked down and so on, it became a way to collect all the

information via cell phone via the internet. If that's the case, it's clear that Kim is digitally literate. The government also provides training advice via Zoom."

In theory, digital literacy is included in the teachings of digital literacy education (Knight et al., 2023). When someone admits that they are digitally literate, it can be said that that person is able to determine which technology is appropriate for obtaining information and disseminating information digitally. KIM Karangbesuki demonstrated his ability to determine the appropriate use of applications to disseminate information, such as when presenting content in the form of long videos, YouTube is the social media used. If you want to make a short appeal or the latest news using Instagram and Tik Tok, then if there is a longer explanation then use the website http://kimkarangbesuki.kimkotamalang.or.id/_to write down the information content. Placing the appropriate type of technology for the type of information to be presented is also a component of digital literacy indicators in an institution (Astuti, 2019).

KIM Karangbesuki's Intentionality towards Digital Literacy

KIM Karangbesuki realized that the desire to have digital literacy knowledge only emerged when Communication and Information Beurau of Malang City carried out digital literacy outreach. This outreach was carried out through agency social media as well as direct outreach to each CIG representative in Malang City. Key informants explained that there was encouragement from the government through Communication and Information Beurau of Malang City to apply the concept of digital literacy in every activity of collecting and disseminating information. It was felt that this directly provided motivation for KIM Karangbesuki to hold digital literacy training activities entitled tackling hoax information.

This training itself is an open program provided by governent through the Karangbesuki sub-district for KIM Karangbesuki. KIM's administrators were given the freedom to choose what type of training they wanted to hold, so with encouragement from Communication and Information Beurau of Malang City, KIM Karangbesuki created digital literacy training. The training provided space for questions and discussions related to technology and the digital world.

"...digital literacy, yes, you could say that KIM already knows a lot about digital literacy because first we are close to conveying this digital literacy through outreach. KIM has become a model for residents on how to use social media well to communicate and disseminate information and then also use the internet to find good information that suits their needs. From KIM we have used social media, there is also a website, we always participate in city forums for. Just make sure that the information we share is correct or not, because sometimes city forums also usually pass on information from the Malang Communication and Information Department, such as new issues that need to be straightened out, that's usually the case.."

If examined intentionally, KIM Karangbesuki's motivation to create a digital literacy training activity entitled countering hoax information following the activities of Communication and Information Beurau of Malang City can be interpreted as a form of business for a social organization following the government as the parent institution so that it can provide community-oriented services (Glazewski & Ertmer, 2020). The continuation of the government's direction and encouragement regarding digital literacy was then translated into a useful guide by the community. KIM Karangbesuki demonstrated its ability to provide direction for its contributors to provide a set of information (images, text, sound, video, etc.) that can be accounted for so that the validity of information production for the digital community does not need to be doubted.

This finding is in line with research by Hidayatullah et al. (2020) that shows community groups in Sumur Panggang also find it easy to organize the dissemination of information through the use of technology with a digital literacy frame. People find it easy to organize the dissemination of information to their environment using appropriate technology so that even though they use digital media, people can still trust the information even without meeting face to face with the information source (Hidayatullah et al., 2020).

KIM Karangbesuki Awareness of Digital Literacy

As previously explained, KIM Karangbesuki became familiar with digital literacy after socialization from Communication and Information Beurau of Malang City. Key informants felt that the government had shown

the benefits and simplicity of digital literacy, especially in KIM Karangbesuki Subdistrict. Based on comments from the 2022 KIM Award jury, which were published in the news on the Communication and Information Beurau of Malang City, it was stated that CIG in Malang City had demonstrated their ability to use digital media to popularize the existence of their region, especially the KIM Karangbesuki which selected as the winner of the 2022 KIM Award, providing an example of media use—attractive digital branding activities for the region's MSMEs (Micro et al.). The initial formation of CIG in Malang City focused on information services and citizen empowerment through reporting local citizen content and using social media to expand the reach of information networks from citizens to the broader community (Yudhistiro et al., 2019). KIM Karangbesuki has a unique program with the theme of digital literacy, namely training entitled "Citizen Journalist Training and Handling HOAX Information" which held in 2022. The result of this program was buillding the direction of local CIG's movement, which is based on the digital literacy components. In particular, the interviewee felt that using the term digital literacy was more understandable with accompanying terms such as literacy, technology, gadgets, social media, and sophisticated rather than the word digital literacy itself. The following are some excerpts from the statements expressed by the sources:

"Yes, sis, the ability to use technology is good. it is smooth, especially on WhatsApp, but if it is more than sending messages or watching YouTube, it seems like it is still not so sophisticated. For example, looking for the correct source of news seems to be lacking because sometimes what is shared with us through the contributor group is still incorrect information..." (Monika)

"I don't understand digital literacy, just good with gadgets, I guess..." (Joko)

"I don't know what kind of digital literacy you have. Maybe you can explain first..." (Wati)

The symbol of awareness of understanding a topic is, in fact, not only a person's ability to provide an understanding of the definition of the topic but also how a person can explain using words that refer to the topic in question (Shadrina, 2019). Most sources are aware of their ignorance of the topic in question but can provide explanations using other terms close to the topic.

KIM Karangebesuki's Reality Constitution on Digital Literacy

KIM Karangbesuki's Human Resources (HR) still needs to be expanded in utilizing the digital devices needed to produce information content for the community. All sources expressed their complaints by showing several pieces of evidence, such as the low frequency of posts on Instagram, TikTok, YouTube and web pages. For example, in May 2023, there were five posts, while in April 2023, there were three posts; other months did not have posts, such as November 2022. Uniquely, even though it has a low frequency of posts, KIM Karangbesuki impacts one of the components of digital literacy, namely safeguarding personal data. The following is an excerpt from the interview:

"Yes, we admit that there is yet to be a program; that is all training, but through our content, KIM has explained how to avoid information and then maintain the security of personal data, do not share it carelessly if there are unknown numbers like that. Usually, residents also ask our administrators via WhatsApp because we are considered good at technology."

In this context, digital literacy is translated by taking its components as a guide in creating organizational programs and problem-solving efforts (Glazewski & Ertmer, 2020). KIM Karangbesuki positions itself as an organization that can evaluate the flow of digital information produced and received by residents by applying the digital literacy concept. KIM Karangbesuki's inability to create special-themed programs for digital literacy due to limited human resources, so it only has a responsibility structure for programs other than its three main programs.

As one of the routine activities participated in, namely the KIM Award, key informants were seen to be frowning more often as if they were thinking about something heavy. Several resource persons are administrators and contributors who are directly involved in preparing for the 2022 KIM Award. This event is considered as a measure of Malang City CIG's seriousness in revitalizing its institution so that when taking part in the KIM Award event, one can see a tired expression because of the preparations that must be made, even though human resources are limited.

Based on the press release for the 2022 KIM Award event at radarmalang.jawapos.com, it is known that one of the aims of holding this event in 2022 is an effort to increase digital literacy for CIG in Malang City (Sampurno, 2022). The aim of increasing digital literacy is not seen as the main focus of participating in the 2022 KIM Award activities by KIM Karangbesuki. The source person stated that the management and contributors focused on creating content about MSMEs in the Karangbesuki area. Some content is not sent directly to the official KIM Karangbesuki account, so searching for the portfolio used to take part in the 2022 KIM Award requires further searching.

KIM Karangbesuki Intersubjectivity towards Digital Literacy

In general, KIM Karangbesuki does not directly claim the meaning of digital literacy in its daily organizational activities. Understanding digital literacy is uniquely focused on technical implementation, like how creating information for society uses technology. This condition can be restated as existential reckoning in psychoanalytic intersubjectivity because of the relationship between the subject's subconscious mind and a technical process—a condition rather than a theory (Guss Teicholz, 2021). Generally, the basis of a social organization's work is its knowledge rather than specific standards created by the institution (Herdono & Mutqiyyah, 2019). KIM Karangbesuki uses the knowledge that he already believes in himself to carry out tasks more quickly. The division of tasks within the organization is also more accessible to the role of protective organizations such as sub-districts, making it easier to organize organizational activities. The following interview results explain the relationship between KIM Karangbesuki and sub-districts, which aims to increase collaboration with the community:

"...Every resident we interviewed was happy because it exists, which also helps because of the promotion. Yes, our residents are among the many, and MSMEs helped. So, for this training, Miss, we also called youth representatives in the RW (small regional society) so they could help create KIM social media content. So, using the facilities from the sub-district, we gathered creative people to help KIM implement the Social Media program."

This condition also occurs in other CIG where the government's role through sub-districts as a protective institution provides convenience in the form of facilities and space accommodation for activities to disseminate information content (Subagyo et al., 2019). In conclusion, KIM Karangbesuki always builds relationships with the community with government support through the sub-district as an umbrella institution.

The next phenomenon that was examined was how adult, pre-advanced, and elderly sources viewed the relationship between the meaning of KIM Karangbesuki and digital literacy. Interviewees who are adults (19-44 years old) believe they already have digital literacy skills, but to show them, they need to have a shared enthusiasm through activities at their CIG. On the other hand, resource persons with pre-advanced and elderly ages (45-59 years and 59 years and above) in KIM Karangbesuki can help the community determine the appropriate steps to find local content information and as a means of digital technology consultation for people who are still technologically illiterate.

Conclusion

Based on the research results, it is known that KIM Karangbesuki has three program ideas: Social Media, Citizen Journalism, and various trainings. Even though it does not have a specific program regarding digital literacy skills, this organization seeks to increase digital literacy skills through journalist training activities and overcoming hoax information to provide instructions for citizens using appropriate social media and obtain credible information. KIM Karangbesuki has included a digital literacy component in all its programs due to the organizational urgency to strengthen existing programs rather than create new ones due to limited human resources. Research analysis emphasizes the constitution of reality. The reality constitution produces a more comprehensive meaning because it can tell the meaning of digital literacy and find the obstacles while implementing KIM Karangbesuki's program. Findings show that contributors and administrators interpret KIM Karangbesuki as a reference provider of local content information in the Karangbesuki area. On the other hand, the administrators and contributors of KIM Karangbesuki interpret digital literacy to create better programs regarding suitability for social media platforms, data security, and the validity of the information disseminated.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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The Importance of Art and Museum Education in Teacher Training

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Abstract: Since art is an action specific to the individual, the development of aesthetic feelings within the education and training processes is an important condition for creating an effective society. People who do not have an artistic consciousness or love for art cannot realize and enjoy the works of art, cultural values and natural beauties they own, cannot protect them, cannot contribute to the cultural development of the society. It is important that art and museums, which have a great impact on all stages of life, are integrated with educational content by future teachers and that teacher candidates learn to integrate them into the classroom within the curriculum, taking into account the interests of the students. In this sense, it can be seen as a necessity for teacher candidates who undertake the education of the next generation to use artistic activities and museums effectively in the classroom, as they undertake the task of transferring social culture. This study aims to reveal the thoughts of Social Studies educators on the importance of art and museum practices in teacher education. In line with this general purpose, evaluations were made in parallel with the opinions of field experts at the end of the research.

Keywords: Social studies, Art, Museum education, Teacher training

Introduction

In the 20th century, educational approaches that focus on the student, such as learning by experience and active learning, have become more important. Accordingly, providing art education in the developing museum environment has also been adopted and implemented in the education process. An education with this understanding can enable you to experience a learning process that is considered quite comprehensive (Wells-Yalcın, 2014). As a matter of fact, during the art education process, students can be provided with the necessary opportunities to develop their artistic perception and skills in a place that can be called freer outside the classroom. In this respect, the 'museum' can be expressed as one of the most suitable places that can be used for this purpose.

One of the places where art education and creativity can be evaluated most comprehensively is the museum (Ayaydın, 2017). Today, it is seen that museums have moved away from the classical mentality of presenting information within the concept of static space and have become a living and contemporary institution as a functional unit that transmits culture, where new expression and presentation methods are used. In line with this understanding, museums now host museum education events in many parts of the world as places suitable for learning by doing, touching and experiencing within the scope of the “constructivist approach” (Şar & Sağkol, 2013). Museums, which are an important source of information, show students alternative ways of learning, offer the opportunity to work actively with material evidence, and through these places, students transform abstract elements into concrete expressions (Lêvy, 2001).

For the development of countries, people with high education levels are needed. These people should be trained in well-designed, non-traditional, contemporary education programs that are constantly open to innovation (Kavuran, 2002). The Social Studies Teaching program of the Faculty of Education, which is one of the institutions that provide art and museum education in the education of modern people, has an important place. Indeed, art reflects the unique cultural perspectives of different cultures; It illuminates migration patterns and

cultural interactions. Additionally, learning about different cultures through art and museum education can reveal stereotypes. Therefore, in addition to being an effective way of learning and teaching processes, art is also a critical component of the Social Studies course. The use of places and museums containing natural and cultural assets in Social Studies courses enables students to discover nearly forgotten works and historical values, while also supporting them in establishing historical empathy. Therefore, the only way to provide individuals with the concepts of inquiry, critical, entrepreneur, aesthetics and creativity is through art and museum education. Considering that Social Studies teacher candidates will teach in secondary schools with the knowledge they have gained, it is important to know the opinions of the faculty members who educate these students about how much they can benefit from works of art and museums and the current conditions of the conditions they provide in terms of the use of art and museums in Social Studies education. This study aims to reveal the thoughts of Social Studies educators about the necessity and importance of art and museum education practices in teacher education. In line with this general purpose, answers were sought to the following questions:

What do faculty members think about using works of art and museums in Social Studies education?
How often do faculty members use works of art and museums in Social Studies education?

Method

Model of the Research

Case study, one of the qualitative research designs, was preferred in the study. In case studies, a limited case is described and examined in depth. Description is defined as the final product obtained as a result of the case study, a rich and intense description of the phenomenon under investigation (Merriam, 2013). The findings section of a case study includes both a description of a situation and the themes or issues uncovered by the researcher (Creswell, 2013).

Study Group

Criterion sampling, one of the purposeful sampling types, was used in the study. The feature of this type of sampling is that the sample consists of people, events, objects, or situations that have certain characteristics related to the problem (Büyüköztürk et. al., 2008). The criterion for this research is that the participants; 1) They are educators in the field of Social Studies and 2) Experts participate in the research voluntarily. The research was conducted in November 2022 with Social Studies educators working at various universities in Turkey. A total of 16 field educators, 9 men and 7 women, participated in the research.

Data Collection Tools

Research data was collected during the 2022-2023 academic year with a standardized open-ended interview form developed by the researcher. During the process of developing the form, relevant literature was used to ensure content validity. Standardized interview is a type of interview in which the "interview plan", which determines in the most detailed way how the pre-prepared questions will be asked and how the data will be collected, is applied exactly. The freedom of action left to the interviewer is minimal. Quantifying and checking the answers is easy in this type of interview (Karasar, 2005). For the reliability of the prepared interview form, the formula Reliability = Consensus / Consensus + Disagreement X 100 was used (Miles & Huberman 2016). According to this formula, the researcher and a social studies field expert coded the written data separately. The agreement between the two coders was calculated as 91 percent.

Analysis of Data

In the study, qualitative data collected with the help of open-ended questions in the standardized interview form were analyzed using the 'descriptive analysis' method. The descriptive analysis of the research was carried out in four stages as suggested by Yıldırım and Şimşek (2016). In the first stage, the researcher created a framework for data analysis based on the research questions, the conceptual framework of the research, and the dimensions included in the interviews. Then, the researcher read the data obtained and arranged it in a meaningful and logical way, depending on the framework she created. After this stage, the researcher described the data she

organized and included direct quotations where necessary. At the end of this process, the findings identified by the researcher were explained, correlated and interpreted.

Results

Opinions on the Use of Artworks and Museums in Social Studies Education

In order to determine the thoughts of the Social Studies faculty members who participated in the research on the use of works of art and museums in Social Studies education, they were asked: "What is the contribution of the art and museum education course to the field?" Are lessons required? If not, why? questions were asked. The answers given by the participants are listed in Table 1.

Table 1. Opinions on the use of artworks and museums in social studies education

Opinions on the Contribution of the Course	Frequency (f)	Percentage (%)
Providing cultural and professional awareness	7	44
Developing critical thinking/ empathy/ communication/ collaboration/ planning/ evidence skills	6	38
Supporting learner-centered thinking	4	25
Effective and permanent learning	4	25
Versatile evaluation opportunity	3	19
Learning with fun	3	19
Gaining experience in using out-of-school learning environments effectively	2	13
Opinions on the Necessity of the Course		
Required as a separate course	9	56
Partially necessary	4	25
Can be given together with history course	3	19

When the answers given by the participants in Table 1 are examined, the most important points regarding the contribution of the course are 'providing cultural and professional awareness' (44%) and 'improving critical thinking / empathy / communication / collaboration / planning / evidence use skills' (38%) it was determined that many opinions were expressed. The least stated opinion was 'gaining experience in using out-of-school learning environments effectively' (13%). Apart from these, the ideas of 'supporting learner-centered thinking', 'effective and permanent learning', 'providing a versatile evaluation opportunity' and 'learning with fun' were expressed by the participants. Regarding the necessity of the course, 56% of the participants support the continuity of art and museum education as a separate course, while 25% of the participants stated that the course is partially necessary. The idea that it should be included in the history course was supported by 19%.

Frequency of Participants' Use of Artworks and Museums in Social Studies Education

In order to determine the frequency of use of works of art and museums in social studies education by the faculty members participating in the research, they were asked: "What is the frequency of your use of works of art and museums in Social Studies education?" Do you use these contents only in Art and Museum Education courses? questions were asked. Details including the opinions of the participants are included in Table 2.

Table 2. Participants' frequency of using artworks and museums in Social Studies education and course distribution

Frequency of Use in Art and Museum Education Courses	Frequency (f)	Percentage (%)
Few lessons	8	50
Every lesson	7	44
No lesson	1	6
Distribution to Courses		
I use it only in 'Art and Museum Education' courses	11	69
I use it in other lessons too	4	25
I am limited to theoretical information.	1	6

When Table 2 is examined, it was determined that not all participants used works of art and museums in all courses, and the rate of those who used them in only a few courses was 50%. The rate of those who do not use it in any course is determined as 6%. At the point of distribution to courses, it was revealed that the majority of the participants (69%) used works of art and museums only in 'Art and Museum Education' courses.

Conclusion

This study aimed to reveal the thoughts of Social Studies educators about the necessity and importance of art and museum education practices in teacher education. At the end of the research, it was determined that the most opinions expressed about the contribution of the art and museum education course were 'providing cultural and professional awareness' and 'improving critical thinking / empathy / communication / cooperation / planning / evidence use skills'. These findings exactly coincide with the results of Buldu's (2023) research. In addition, Yılmaz and Şeker (2011), in their study on museum visits and the use of museums in teaching Social Studies, stated that students can develop evidence-based skills by examining artifacts from various civilizations in museums. At least the opinion of 'gaining experience in using out-of-school learning environments effectively' was expressed. Apart from these, the ideas of 'supporting learner-centered thinking', 'effective and permanent learning', 'providing a versatile evaluation opportunity' and 'learning with fun' were expressed by the participants. There is consistency with the study of Lemon and Garvis (2014), which supports this result. Regarding the necessity of the course, 56% of the participants support the continuity of art and museum education as a separate course, while 25% of the participants stated that the course is partially necessary. The idea that it should be included in the history course was supported by 19% of the participants. In addition, the findings of the study revealed that not all participants used works of art and museums in all courses, and the rate of those who used them in only a few courses was 50%. The rate of those who do not use it in any course is determined as 6%. At the point of distribution to courses, it was revealed that the majority of the participants used works of art and museums only in 'Art and Museum Education' courses.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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Increasing the Effectiveness of Fake News Detection: An Educational Program for High School Students Using Interactive Neural Network Training and Collective Intelligence

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Abstract: This paper presents the project results designed to provide high school students with essential ICT tools to identify and counteract fake news and disinformation commonly found on the Internet, especially on platforms like X/Twitter. Additionally, it introduces an educational program that utilizes interactive neural network training and collective intelligence to combat fake news. For this project, there was developed an IT framework enabling the collective training of a specialized neural network. In order to conduct a quasi-experiment, we engaged three research groups of high school students, each containing app. 10-15 members. Through a set of comprehensive workshops, the students were trained to recognize harmful online content. After this training, students actively participated in data classification on various topics, laying the foundation for the neural network's training model. The presented results underscore the efficacy of this immersive method in imparting digital literacy and enhancing the group intelligence. Moreover, the results highlight the promising potential of machine learning in assisting youth to navigate the complex digital terrain safely and responsibly. The final phase of the conducted research involved testing the trained neural network in detecting disinformation, particularly in the topics of 5G technologies and immigration problems in Poland.

Keywords: Fake news, Disinformation, Education, Neural networks, Collective intelligence, High school

Introduction

The digital era, while offering numerous benefits, has given rise to a complex problem: the proliferation of disinformation and fake news (FN). This phenomenon has garnered international concern due to its potential for widespread manipulation and its detrimental effects, particularly across social media platforms. One of the most daunting tasks in today's digital public sphere is the filtration of 'information noise' to extract meaningful content from the cacophony of online discourse. The pervasive nature of such noise poses a dire threat to the integrity of our information ecosystems, undermining the ability of users to differentiate between reality and falsehood. High school students represent a demographic particularly susceptible to these pitfalls, often lacking the necessary critical acumen to navigate the complexities of online information. This research paper introduces an innovative initiative designed to equip students with the requisite competencies and tools to navigate and counteract the tide of disinformation prevalent in the online environment.

The educational part of the project was carried out by a Polish non-governmental organization – Instytut Aurea Libertas from April to December 2022. Concurrently, the research aspect was conducted by social scientists affiliated with AGH University of Science and Technology in Krakow, taking place in June and October of the same year. The project explored a novel methodology that harnessed artificial intelligence (AI)—notably neural networks—in synergy with Collective Intelligence (CI). The efficacy of this approach in mitigating the spread of fake news was evaluated via a quasi-experimental design. High school students were engaged in the collective training of a neural network to identify and filter deleterious content on social media. The initiative concentrated on two prevalent topics of misinformation: spurious claims associated with 5G technology and negative stereotypes concerning Ukrainian migrants in Poland. The objective was to bolster the digital literacy

of students and to establish a replicable model for broader educational application. The approach demonstrated its value, achieving marked improvements in the participants' knowledge and competencies in identifying fake news and enhancing the overall efficacy in countering disinformation.

Literature Review

The escalating spread of fake news (FN) has emerged as a critical issue in recent years, gaining particular urgency amidst the Covid-19 pandemic, social upheaval, and armed conflicts globally. Fake news is characterized by Allcott and Gentzkow (2017) as *a news item that is deliberately and verifiably false*. Similarly, Kshetri and Voas (2017) define it as any media message disseminated through media channels that contains false information, regardless of the methods and motivations behind it. The proliferation of fake news poses a significant threat to free speech and the integrity of ethical journalism, eroding public trust in institutions. Moreover, the rise and ubiquity of social media platforms have dramatically amplified the spread of false information.

Fake news frequently targets topics crucial to public debate, thereby influencing the formation of social and political opinions among voters, opinion leaders, and politicians. Disinformers employ half-truths, edited videos, and selective reporting to propel their narratives, rendering fact-checking occasionally ineffective. Here are some subjects that have been particularly vulnerable to fake news in recent years:

1. **Health and disease** (e.g., coronavirus pandemic, vaccines): Misinformation proliferated during the pandemic, with claims of unconventional cures and prevention methods. Additionally, numerous false assertions regarding COVID-19 vaccines, such as altering DNA or containing tracking microchips, have been disseminated (Carmichael & Goodman, 2020).
2. **Street riots and social unrest**: Fabricated images and videos, sometimes repurposed or AI-generated, have been used to exaggerate chaos and violence in protests and riots, often discrediting the actual events and participants (Bahl, 2023; Lee, 2020).
3. **Public figures in controversial situations**: Technologies like deepfakes create misleading images or videos of public figures in fabricated scenarios, leading to public deception. An instance includes manipulated images of former US President Donald Trump in fictitious legal troubles (Aleguas, 2023).
4. **Conspiracy theories**, both old and new, have flourished in the age of social media, encompassing various topics like 5G technology being accused of mind-control intentions (Ahmed et al., 2020).
5. **Military conflicts**, such as the war in Ukraine, have been marred by the spread of disinformation and fake news, with conflicting parties making unverified accusations and spreading falsehoods about events like the Bucha massacre (Marchant de Abreu, 2022).

Empirical evidence indicates that exposure to high levels of information noise can diminish an individual's ability to effectively identify relevant and accurate information (Bessi et al., 2016; Vosoughi et al.,2018). Studies in social psychology and communication reveal that humans tend to act irrationally and struggle to distinguish between truth and falsehood when overwhelmed by a surplus of misleading information. Such studies suggest that, under conditions of cognitive overload and information noise, human accuracy in detecting deception is only slightly better than random guessing, with accuracy rates typically ranging from 55% to 58% (Zhou & Zafarani , 2020).

A review of the literature on current trends in combating FN shows that various detection techniques are evolving independently. For instance, technology that analyzes the language used in FN, including vocabulary and syntax analysis, has garnered considerable attention. Meanwhile, the study of FN propagation patterns on social media forms an entirely separate domain. Only recently have there been efforts in academic literature to systematize various FN combat strategies, acknowledging their potential for mutual reinforcement. The most noteworthy attempts, in my view, were made by Zhou and Zafrani in *A Survey of Fake News: Fundamental Theories, Detection Methods, and Opportunities* (Zhou & Zafrani, 2020), and by Collins and his team in *Trends in combating fake news on social media – a survey* (Collins et al., 2020).

In Zhou and Zafrani's work, authors divided the methods for combatting fake news into four main groups: knowledge-based (manual and automated fact-checking), style-based (analysis of text from lexical, syntactical, sentiment, and rhetorical perspectives), propagation-based (examination of how users distribute fake news), and source-based analyses (evaluation of the reliability of the news source). Fact-checking, often employed in the knowledge-based approach, involves the comparison of the information derived from the news content that is

being verified (like its claims or statements) with known facts. Style-based techniques, conversely, evaluate the intention of the news, looking for distinguishable patterns in the content (text and images) of fake news versus real news. The propagation-based method follows the trail of how fake news is disseminated by internet users. Lastly, source credibility analysis determines the trustworthiness of those involved in creating and distributing the content, necessitating the establishment of standards for reliable and unreliable authors or publishers (Zhou & Zafrani, 2020).

In the second paper by Collins and his team, they present a comprehensive review of various fake news detection models. These models include techniques such as expert fact-checker approach, natural language processing, machine learning, recommendation system, deep learning, graph-based methods, and crowdsourcing (Collins et al., 2020). Collins et al. suggest that future anti-fake news systems could benefit from a hybrid model, which integrates two or more techniques, asserting that such a system can achieve an impressive detection accuracy rate of 87% (Collins et al., 2020).

Thus far, no model for fake news detection has been developed that principally utilizes the concept of Collective Intelligence (CI) as its operative mechanism. Collective intelligence is defined as the widespread capacity of a group to address problems, primarily through the aggregation of data, ideation, and decision-making processes. This capacity arises from the synergistic interaction and competition among numerous individuals (Woolley, 2010). In recent years, the CI phenomenon has garnered considerable interest from researchers, with collectives engaging in generating potential solutions, evaluating and refining them, synthesizing and organizing knowledge and insights, and ultimately arriving at joint decisions. While Shabani and Sokhn (2018) made some efforts to leverage CI in the detection of fake news, these initiatives did not achieve optimal results due to the collective's limited engagement in content classification.

Method

The methodology implemented in this project was multifaceted, encompassing: (1) the technical and substantive development of the educational program and IT tools, and (2) the execution of a quasi-experiment with high school students.

The project's educational materials included three workshop scenarios designed to enhance the detection of fake news in topics particularly vulnerable to misinformation during the study period, video tutorials, IT software for the collective training of a neural network, and IT software for identifying fake news on social media.

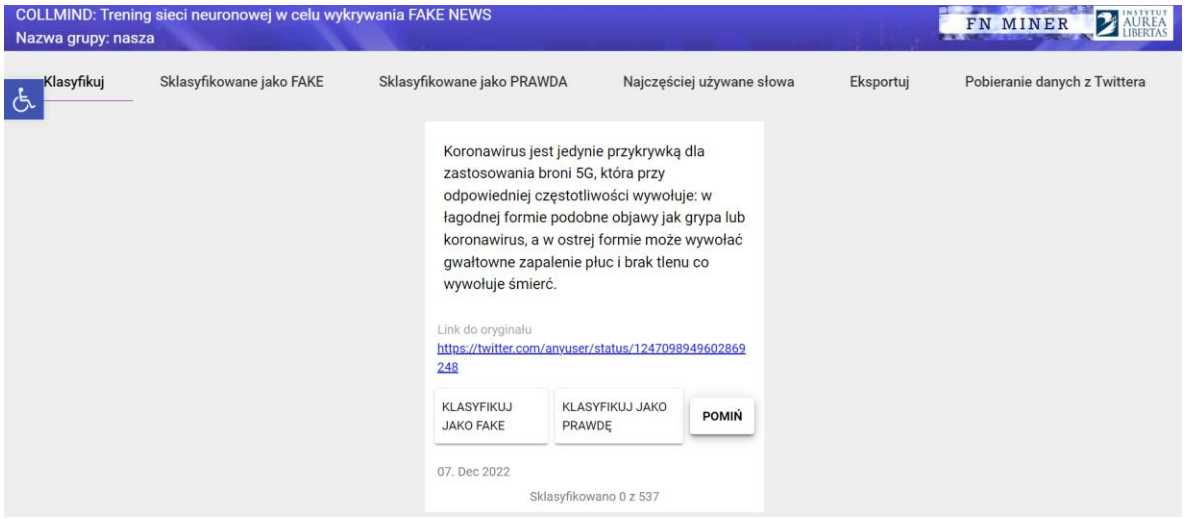


Figure 1. The software used to train the neural network in the project: A classification screen.

The project commenced with a series of interactive workshops aimed at educating participants on the nuances of harmful online content, with a particular emphasis on three critical topics of disinformation. These sessions were led by experts in digital literacy, media studies, and artificial intelligence, ensuring a multifaceted understanding of the issues. The objective was to furnish students with the ability to identify and comprehend the ramifications of online disinformation.

At the core of the initiative was the development of an IT framework facilitating the collective training of a neural network. The neural network training software was developed using Node.js version 6.2.10, React, Polymer.js, JavaScript, HTML, and CSS. Compilation and management of sources were handled through NPM, PM2 was utilized for backend server operations, and PostgreSQL served as the database platform. For fake news detection, the software was created within the Orange Data Mining suite, employing a script that utilized text processing tools (such as lowercase transformation, HTML parsing, URL removal, tweet tokenization, regular expression filtering) and machine learning models (including neural networks and Naive Bayes). The platform was intentionally designed for ease of use, enabling students to efficiently classify data on the chosen topics. This classified data was instrumental in training the neural network to identify and mark disinformation pertinent to the specified subjects.

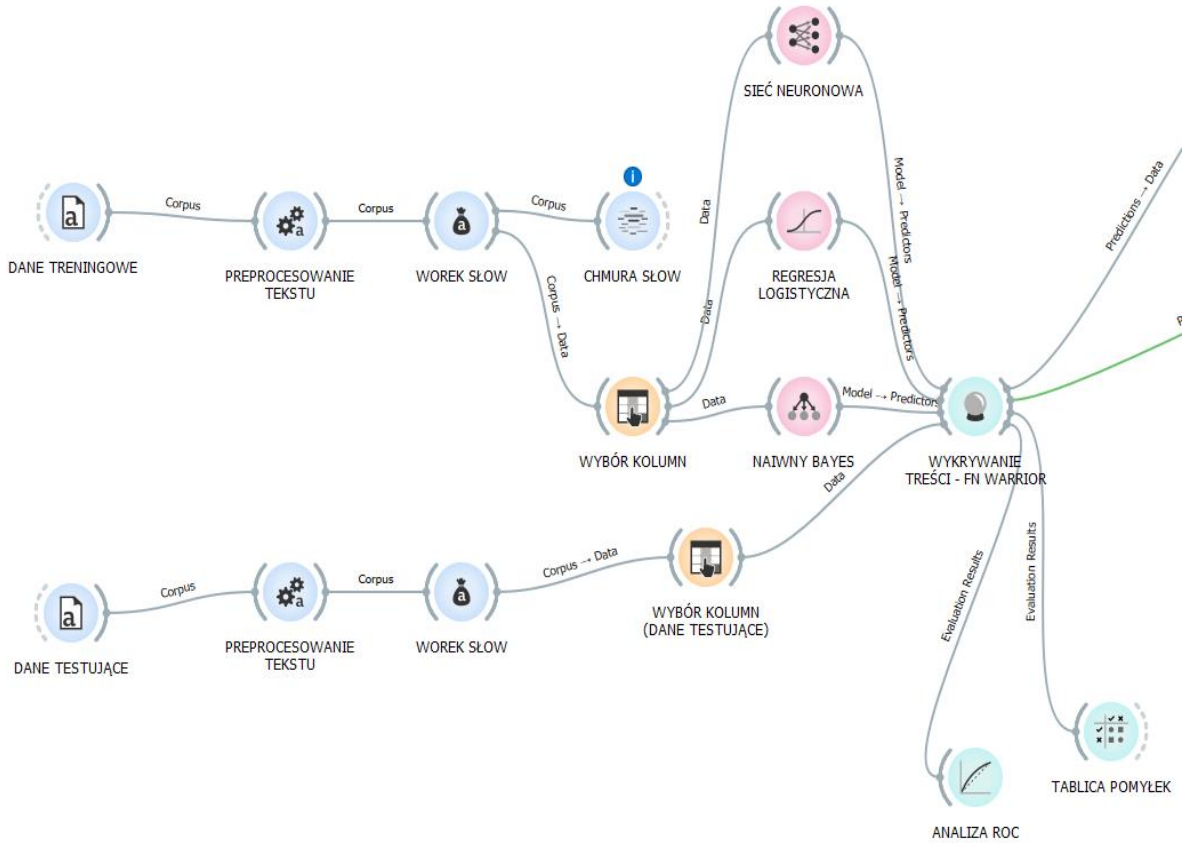


Figure 2. The script used to detect fake news prepared in the Orange Data Mining environment: the main workflow.

The quasi-experiment involved the recruitment of three research groups from high school students, each comprising approximately 10-15 members. The study included conducting educational workshops, facilitating data classification by the students, and evaluating the effectiveness of the trained neural network. Recruitment took place at two secondary schools in Krakow, Poland, with the study being conducted in June and October 2022. The diverse backgrounds of the recruited students enriched the data classification process. Selection criteria were based on their interest in the project, frequent use of social media, and eagerness to learn new techniques.

The main task of the recruited groups was to conduct workshop scenarios concerning detecting fake news in the field of 5G technology and stereotypes regarding immigration. The dataset for classification comprised approximately 1,000 posts sourced from the Twitter platform, which were collected via software interfaced with Twitter's API and selected based on specified keywords.

It is important to note the variation in classification categories adopted for the two distinct topics due to their inherent specificities. The topic of 5G networks falls within the broad realm of business, albeit with significant social implications. For this topic, the classification categories were defined as: (a) fake news and (b) true information. In contrast, the topic of immigrants pertains to public affairs discourse, and the classification categories were designed to identify: (a) negative, harmful stereotypes indicative of disinformation, and (b) the

absence of such stereotypes. During the study, the following research tasks were undertaken: (1) verifying the effectiveness of the proposed educational method; (2) conducting qualitative research through individual in-depth interviews with participating students; and (3) assessing the effectiveness of collective effort in detecting fake news using the provided software, according to the tested scenario.

Results and Discussion

The project produced highly encouraging outcomes. The participating high school students showed an increased sensitivity towards the issue of disinformation and its various manifestations across social media platforms. This new-found awareness was evident in their ability to discern between factual and misleading content, which was a significant aim of the project. They demonstrated a deep comprehension of the selected disinformation topics i.e. fake news concerning 5G technology and stereotypes about Ukrainian migrants in Poland. This understanding was manifested in the precision of their data classification efforts. Each student, having been exposed to these topics during the training workshops, was able to accurately classify data which was then utilized to train the neural network. This showed their ability to translate theoretical knowledge into practical application.

The Effectiveness of the Proposed Educational Method

The effectiveness of the proposed method was examined in two ways. The first was an evaluation of the acquired knowledge and competences in detecting fake news, carried out among students participating in the quasi-experiment. This was done using a Pre-Test conducted before the workshop, and a Post-Test carried out at the end of the work. The aim of the study was to check how much students improved their competences in recognizing fake news. The tests were anonymous, the answers below are given in random order. The test result was highly satisfactory: an average increase of 39.6% in the competencies of the participating students was observed**.** Below, Table No. 1 presents the individual increase in competences in Group No. 2, as an example.

Table 1. Increase in the individual competences in recognizing fake news in Experimental Group No. 2.

No.	PRE-TEST result (points, max = 10)	POST-TEST result (points, max = 10)	Increase of Competences
1	6	7	14%
2	6	7	14%
3	5,5	7,5	26,6%
4	5	8	37,5%
5	5	8	37,5%
6	4,5	8	43,7%
7	4,5	8	43,7%
8	4,5	8,5	47%
9	3,5	8,5	58,8%
10	3,5	9	61,1%

Qualitative Research Based on Individual In-depth Interviews

The qualitative study was carried out based on Individual In-depth Interviews conducted with students participating in the project. Each interview lasted about 30 minutes and concerned young people's opinions and conclusions regarding participation in the study and awareness of the threats related to the spread of fake news on the Internet.

During the interviews, a notable shift in the participants' awareness was observed due to interactions within the group. Collaborating on content classification to train the neural network necessitated the confrontation of various opinions and viewpoints, requiring mutual listening to reach a consensus. The change in participants' awareness revolved around a better understanding of the complexities associated with fake news (FN) and disinformation, recognizing that seemingly straightforward statements often have underlying meanings and are open to multiple interpretations. According to the majority of participants, a better understanding of the issues with FN and disinformation resulted in enhanced group work effectiveness and, consequently, an increase in the group's collective intelligence in ICT-supported fake news identification.

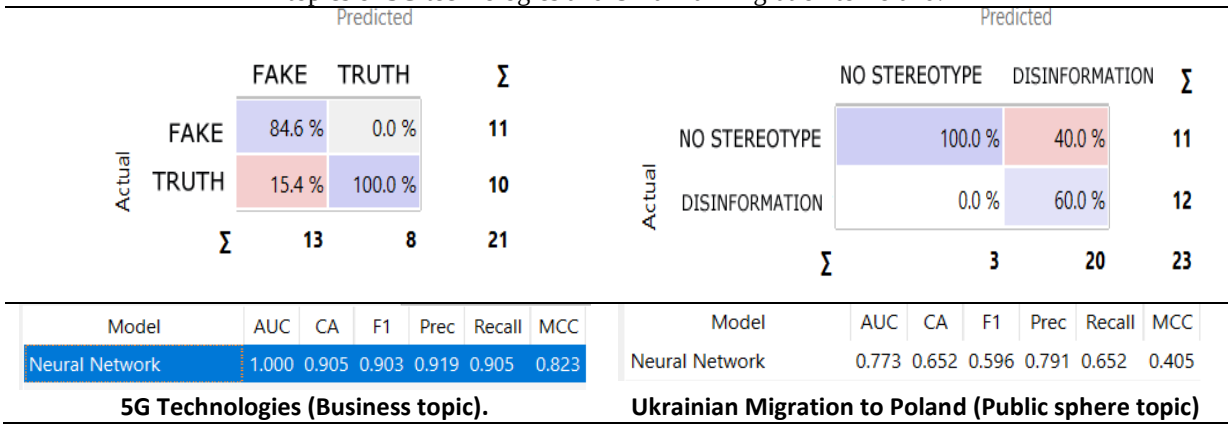
Additionally, a sense of collective effort towards a common good and achieving a common goal was cultivated through engagement in opposing harmful online content. Observing the outcomes of collective efforts, such as the trained neural network reflecting the group's collective opinion, was an intriguing experience for participants. It fostered a sense of agency and awareness that collectively they could achieve more than individually. About 80% of the project participants felt that working collectively to address the problem brought them satisfaction from the achieved results, which they couldn't have accomplished individually. The synergy effect attained through group work allowed for the realization of a result beneficial for all, epitomizing the product of collective intelligence.

The Effectiveness of Collective Content Classification: Measuring the Level of Fake News Detection

The final phase of the conducted research involved testing the trained neural network in detecting disinformation. For testing, we chose two topics that were particularly susceptible to the spread of fake news during the period when the project was conducted. The first one was related to 5G technologies, which was at that time a business-related topic particularly susceptible to the spread of conspiracy theories. The second one concerned disinformation and negative stereotypes related to the increased immigration of Ukrainian citizens to Poland. As a matter belonging to public sphere, it was a hot topic because of the war and social migration from Ukraine to Poland in 2022. In order to conduct the effectiveness evaluation, two sets of 21-23 social media posts were extracted from classified databases and set as testing data. Then a performance test was carried out.

Despite these difficulties, the neural network was capable of identifying and flagging disinformation related to the chosen topics effectively. It performed with a considerable degree of accuracy, suggesting that the collective training approach adopted in this project was successful. The students were not only able to train the network but also helped in refining it to function optimally.

Table 2. Confusion matrices and performance scores for the tested neural networks detecting fake news on the topics of 5G technologies and Ukrainian migration to Poland.



Model	AUC	CA	F1	Prec	Recall	MCC
Neural Network	1.000	0.905	0.903	0.919	0.905	0.823

5G Technologies (Business topic).

Model	AUC	CA	F1	Prec	Recall	MCC
Neural Network	0.773	0.652	0.596	0.791	0.652	0.405

Ukrainian Migration to Poland (Public sphere topic)

There is an eye-catching difference in the effectiveness of both models. The model associated with 5G networks has extremely high efficiency, and in the case of True Negative it is 100% effective. The situation was slightly different in the case of the model regarding migrants. Here, the absence of a negative stereotype towards migrants was detected in every case, but the detection of a negative stereotype/disinformation was only possible in 60%. It seems that the model was not able to effectively detect many disinformation statements connected with negative stereotypes, due to the greater controversiality and complexity of the issue than in the case of the 5G networks.

Conclusion

The presented study has made a compelling case for an interactive, experiential approach to teaching high school students about digital disinformation. It was proved, that by actively involving students in the process of training a neural network, they not only gained a more profound understanding of the nature of online disinformation but also collectively contributed to the creation of a tool that could be instrumental in mitigating this widespread issue. This is visible both at the level of individual people's knowledge test results, and collective intelligence released by a shared commitment to accomplish useful work leading to better

understanding of the complex problems associated with disinformation. This immersive learning experience enhanced students' understanding and perspective of the examined topics, and highlighted the potential of artificial intelligence and machine learning as powerful tools in combating digital disinformation. Collective involvement in joint preparation of a neural network model helped to increase participants' involvement in combating disinformation, making the learning experience more meaningful and impactful for them.

The revealed differences between the effectiveness of model trained to detect fake news regarding 5G, and the model that detects disinformation regarding migrants from Ukraine also lead to important conclusions. It can be assumed that it is much easier to detect disinformation in non-political areas, where "ground truth" can be more easily defined. However, in the case of issues belonging to the public sphere, statements are the subject of greater controversy and create a wider field for interpretation. This shows in which domains fake news detection using trained artificial intelligence can work better, which is a valuable observation for the future.

The project's success indicates that similar approaches, which integrate practical, technology-focused projects into the curriculum, could be fruitful in other educational contexts. Schools, educators, and policymakers should explore and adopt such methodologies to equip their students with the necessary skills to navigate the digital challenges that they will inevitably encounter in their future lives. The fight against disinformation is a collective effort, and young people, being digital natives, are an indispensable part of this battle. Empowering them with the right skills and tools is, therefore, a step in the right direction.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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Analysis of School Principals' Cohesion on the Sekolah Penggerak Program As a Catalyst to Realize the Vision of Indonesian Education in the City of Yogyakarta

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Abstract: The implementation of the Sekolah Penggerak Program since the 2021/2022 academic year has given rise to various adjustment dynamics, one of which is the competence of school principals. This research aims to examine: (1) the cohesion of school principals towards the implementation of the Sekolah Penggerak Program which relies on the school principal, and (2) the supporting and inhibiting factors for implementing the Sekolah Penggerak Program as a catalyst to realize the vision of Indonesian education. Developing the competency of school principals in Yogyakarta City. This research was conducted in schools that have implemented the Sekolah Penggerak Program in the city of Yogyakarta. Qualitative data collection was carried out by observation, documentation and interviews. The data analysis technique uses three activity flows, namely: 1) data reduction, 2) data presentation, and 3) conclusions. The research results show that: (1) Implementation refers to the guidelines of the minister of national education. (2) Organizing is carried out by registering the Principal as a participant in the school mobilization program (3) Implementation is carried out through workshops, internal training, In House Training (IHT), Collaborating in a Community of Practice with other Mobilizing School Principals, school principals receive management and leadership training Instructional (4) Control is carried out through supervision of activities by expert trainers and supervisors. (5) The supporting factors are: first, the school has a budget for program development. Second, the principal's high motivation in participating in the training program. Third, the school has quality leaders. The four principals have the right strategy in the school development process, especially learning management. The inhibiting factors are; First, school principals must adapt quickly so that program implementation is fast. Second, the school principal is bored studying a lot of material. Third, the age factor of the principal who has to learn from the start to adapt to the program. Fourth, the school principal is not ready to face program changes. Fifth, the school principal is not ready to implement the Sekolah Penggerak Program.

Keywords: Sekolah penggerak program, School principal, Educational vision

Introduction

The principal, who is considered the highest leader in the school, often becomes a role model for all teachers, staff and students at the school, including being interested in running school programs, but often a principal does not show interest in building the school he leads. This article aims to add to the study, especially cohesion,

interest or interests of school principals regarding the implementation of the program which relies on the principal and has been implemented in the past three years. Cohesion is an awareness of a person's interest or interest in an object, person, problem, or situation that is related to him. This means that interest must be seen as an awareness. Therefore, interest is a psychological aspect of a person who has high attention to certain activities and encourages the person concerned to carry out these activities. Meanwhile, the level of attention and psychological drive for each person is not necessarily the same, so that the level of interest in the object for each person is also not necessarily the same in cohesion, so information can be extracted that can become the basis for the success of the program sekolah penggerak. Based on observations and findings from previous research, there are gaps that are problematic, namely: (1) it was identified that sekolah penggerak Program principals should be agents of change that have an impact on teachers, students and staff but this has not been implemented optimally. (2) the competence of school principals is not yet optimal in participating in the driving school program. The driving school curriculum that should be implemented by the driving school has not been implemented optimally.

This research is different from previous research, this can be seen from several previous studies, namely, research conducted by Waruwu, 2022 in the journal of community service. In this research, the problem raised focused on the Empowerment of School Principals and Teachers in the Implementation of the Sekolah Penggerak and Independent Learning School Program, further carried out by Yantoro, 2022 in the journal Gentala Basic Education, regarding the implementation of the leadership competency model for school principals in Sekolah Penggerak (competency model analysis study Jambi University partner school leadership). Another research by Hamid, 2022. School principals must understand the school competency model which consists of four categories, namely 1) development of self and others 2) learning leadership 3) leadership 4) school development leadership.

Of the four model categories, the Principal is given in-depth material about increasing school competency, especially the Principal as a learning leader in the school, so that the Principal knows more deeply about the four competency categories of leadership, namely a) leading efforts to develop a learning environment that is centered on students, b) leading the planning and implementation of student-centered learning processes, c) leading reflection and improving the quality of student-centered learning processes, and d) involving parents/guardians of students as companions and learning resources at school. Other research also discusses mobilizing schools by Mariana, 2021. The results of mobilizing school principals are able to move school operations and become facilitators for teachers in schools. Student-centered learning is carried out using a micro-learning approach and is adapted to students' abilities, talents and interests. Learning is planned according to students' abilities and various activities are expected to make students comfortable and happy while studying at school. The principal as a leader in the school is capable become a locomotive of change in schools.

Based on the description above, the problem that will be studied in this research is regarding the cohesion or interest of school principals in implementing the sekolah penggerak program in Yogyakarta City, starting with the readiness of the school principal in implementing the sekolah penggerak program, what are the supporting and inhibiting factors in implementing the program.

Research Methods

This type of research is qualitative descriptive research with a case study method, namely research on individuals, groups, one organization at a certain time (Arifin, 2011). This research was conducted at Yogyakarta City Elementary Schools which are included in stage 1 driving schools as independent program implementers. The object of this research is school principals who have been selected and are implementing the sekolah penggerak program. This research will analyze the attachment or interest of school principals towards the driving school program and describe the various difficulties faced by sekolah penggerak when implementing independent learning programs and independent curricula. The selection of informants in this research used a purposive sampling technique.

To obtain the desired data, the author used observation, interview and documentation techniques. Checking the validity of the data in this research uses diligent observation, member checking, and triangulation which consists of source triangulation and technical triangulation. Meanwhile, the data analysis technique uses the Miles and Huberman model (Hardani, et al, 2020: 163), namely data reduction, data presentation and drawing conclusions/verification.

Results and Discussion

The sekolah penggerak curriculum is a refinement of the previous school transformation program (Falma, Bentri, Gustutui & Muji, 2021). The sekolah penggerak curriculum is an effort to realize the vision of Indonesian Education in realizing an advanced Indonesithat is sovereign, independent, and has personality through the creation of Pancasila Students (Sibagariang, Sihotang, & Murniarti, 2021). The Sekolah penggerak curriculum will accelerate public and private schools in all school conditions to move 1-2 stages further. The program is carried out in stages and is integrated with the ecosystem until all schools in Indonesia become the sekolah penggerak program. Evaluation model (CIPP) Context, Input, Process and Product used to evaluate the implementation of the sekolah penggerak, sekolah penggerak are schools that focus on developing student learning outcomes holistically by realizing the Pancasila Student Profile which includes competence and character starting from superior human resources (school principals and teachers) therefore the school principal is one of the drivers and targets of program implementation The sekolah penggerak must have a large and strong interest or passion. According to Hakim, Lukmanul (2009:38). Interest is a person's interest in paying attention or being actively involved in learning activities. Under these conditions, according to Mariana, 2021. The sekolah penggerak principal must have cohesion or interest and be able to drive school operations and become a facilitator for teachers at the school. In implementing the sekolah penggerak program, school principals must also increase their competence in accordance with the sekolah penggerak program with a new paradigm regulated in the Decree of the Minister of Education, Culture, Research and Technology Number 162/M/2021 concerning Driving Schools.

Apart from that, according to Falma, 2021. The presence of a driving school curriculum in schools from the start was intended to change the school culture by involves the power of resources from within the school itself and not from external forces. The sekolah penggerak curriculum as a driving force for the transformation of Indonesian education is expected to be able to support the holistic growth and development of students so that they develop into students who adhere to Pancasila, become coaches or mentors for other teachers for student-centered learning, and become role models and role models as agents of transformation. educational ecosystem. The implementation of the sekolah penggerak program begins with teacher recruitment, then after that the education of prospective driving teachers is carried out, and then it is hoped that it will be able to produce a new generation of teacher education leaders who will later become school principals, school supervisors and teacher training instructors. The principal's interest in implementing the sekolah penggerak program.

Principal's Interest in the Program Sekolah Penggerak

The vision of Indonesian Education is to create an advanced Indonesia that is sovereign, independent and with personality through the creation of Students with Pancasila which are featured in the new program design as an effort to advance education in Indonesia(Ministry of Education and Culture, 2021). The Mobile School Program consists of five interventions that are interrelated and cannot be separated , namely 1) Consultative and asymmetric assistance 2) Strengthening School Human Resources 3) Learning with a new paradigm 4) Data-based planning 5) School Digitalization. One of the five program interventions that focuses on school principals is Strengthening School Human Resources Strengthening School Principals, School Supervisors, Inspectors and Teachers through intensive one-on-one training and mentoring programs with expert trainers provided by the Ministry of Education and Culture. This program is a form of strengthening school principals in running sekolah penggerak which includes in-house training, district/city level workshops, learning/practitioner communities (maple groups), coaching programs, 1-on-1 with school principals, partnering with principal teachers -teachers are trained nationally to provide group assistance with teachers. Carried out periodically every 2-4 weeks during the program, and therefore based on the driving school program which provides many platforms for school principals to improve their competence and learn to become competent leaders while implementing the sekolah penggerak program.

Mechanistically, the school has implemented a sekolah penggerak program through the selection of principals as sekolah penggerak principals and teachers as learning leaders who implement independent learning and mobilize the entire educational ecosystem to realize student-centered education. Strengthening School Principals, School Supervisors and Teachers through intensive training and mentoring programs. Teachers will also create a variety of fun activities that include critical reasoning, collaboration, and creative competence. Through the Pancasila Student Profile, programs implemented by school principals and teachers will Mechanistically, the school has implemented a sekolah penggerak program through the selection of principals as sekolah penggerak principals

and teachers as learning leaders who implement independent learning and mobilize the entire educational ecosystem to realize student-centered education. Strengthening School Principals, School Supervisors and Teachers through intensive training and mentoring programs. Teachers will also create a variety of fun activities that include critical reasoning, collaboration, and creative competence. Through the Pancasila Student Profile, programs implemented by school principals and teachers will generate student profiles. To mobilize schools that are capable of producing students who have noble character, are independent and independent, have the ability to reason critically, be creative, work together, and have a sense of diversity in the nation and state. From parents to community leaders, local government. Everything supports the quality of student learning. Based on all the programs that have been implemented with a very neat system and full of collaboration to make the principal the front guard in advancing the school he leads, then the principal who implements the sekolah penggerak program and independent curriculum with a focus on the Pancasila student profile should be a school principal. must show seriousness and cohesion or interest in carrying out the sekolah penggerak program.

The cohesion or interest of a school principal must be the main reference in implementing new programs in the educational environment, including the implementation of the current sekolah penggerak, during the implementation which started in 2021 there were several significant changes in the schools that registered as sekolah penggerak, this can be seen from the head schools that are communicative and adaptive and teachers and students who are creative with the programs implemented. In the city of Yogyakarta itself, there are 8 elementary schools that have been selected as sekolah penggerak, the selection of which is based on the selection of school principals in the sekolah penggerak program and after training the school principals apply the results of their learning to teachers and students to implement the sekolah penggerak program, basically based on observations that have been made. I think there has been good progress during the implementation of this sekolah penggerak program starting from adaptive and increasingly competitive school principals, creative teachers and increased enthusiasm and interest in student-centered learning, as well as a curriculum that is flexible and can adapt to cultural conditions. and school environment. Apart from that, the first supporting factor is that the school has a budget for development programs. Second, the principal's motivation is high in participating in this coaching program. Third, the school has quality leaders. The four principals have the right strategy in the school development process, especially learning management.

However, among these supporting factors, there are also factors inhibiting the implementation of the sekolah penggerak program. First, school principals must adapt quickly so that this program can be implemented quickly. Second, the school principal is bored studying a lot of material. Third, the age factor of the principal who has to learn from the start to adapt to the program. Fourth, the school principal is not ready to face program changes. Fifth, the school principal is not ready to implement the driving school program. However, based on the supporting and inhibiting factors that have been explained, researchers found that school principals still have an interest in the sekolah penggerak program because the program obtained by schools, especially school principals, provides benefits in increasing the competence of school principals and providing learning space and places for school principals to improve his leadership capacity. Conceptually, sekolah penggerak can solve some of the problems found in the curriculum of 2013, such as learning time and learning loads. However, a solution to the problem of a scientific approach was not found. It is better if the concept of sekolah penggerak can develop a scientific approach because it is important for constructing students' knowledge and leadership capacity (Magdalena, 2022).

Conclusion

Having a sekolah penggerak can be a role model, a training ground, and also an inspiration for teachers and other school principals. Thanks to the tenacity and tenacity of the school principal who encouraged various unique participatory programs, and many innovations, as well as the cooperation of the teachers who support their leaders to participate in creating sekolah penggerak, sekolah penggerak make school principals understand the student learning process and become mentors for teachers in schools. In sekolah penggerak, there are teachers who understand that every child is different and has a different way of teaching, according to the right level to produce a profile of students who have noble character, are independent and self-sufficient, have the ability to reason critically, be creative, work together and have a sense of diversity domestically and globally. A very significant finding from sekolah penggerak is the support from the community around the school which supports the educational process in the classroom. Then support from parents to community leaders, local government.

All of this supports the quality of student learning and the competence of principals in sekolah penggerak. However, the author feels it is very necessary to carry out relevant research again to support the achievement of the sekolah penggerak program. With the existence of a sekolah penggerak, it is hoped that school principals can develop according to their potential and abilities because with the sekolah penggerak program they receive activities that are innovative, high quality, expressive, applicable and progressive. And changes to this new educational program require cooperation, strong commitment, seriousness and real implementation from all parties, so that increasing the competence of school principals and Pancasila student profiles can be embedded in students.

Recommendation

Based on the conclusions of the research results, the author hereby recommends to: a). School principals should always try to increase cohesion or interest in implementing sekolah penggerak programs and new programs that can support school progress, b). To improve the quality of schools from various elements, the competence of school principals is very influential, so it is necessary to have a fighting spirit, learn new things and prepare oneself to work harder in order to support competence as an adaptive school principal, c). The government/policy makers must always provide support and motivation to schools as the sekolah penggerak program is implemented, d). Other researchers, e). In order to carry out further research that can reveal more deeply about the cohesion of school principals in the implementation of sekolah penggerak because this research is still far from expectations and is still very limited, f). So that steps can be followed up by conducting the same study in other settings, as well as other schools in general which can act as the necessary evidence to provide additional data to reduce errors in the findings in this research.

Scientific Ethics Declaration

The author states that the ethical and legal responsibility of articles published in the EPESS journal is the responsibility of the author.

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Self-Reflection on the Meaningfulness of Vocational Students' Lives and Their Expectations from the Future in the Context of Demanded Quality

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Abstract: Vocational education has a special and irreplaceable place in the educational system of each country. On its quality depends continuous transition of graduates into the world of labour. The article analyses the research, organized for students of secondary vocational schools. The ambition of the research was to find a mutual intersection of two levels of life of young people - students of secondary vocational schools. The first level examines how young people evaluate the meaning of their lives, how they perceive their future, the goals of life and its direction through the scale of subjective attitudes The second level analyses the students' opinion of their readiness for the labour market, as vocational training naturally reflects on the world of labour and consistently cooperates with it. Students are regularly confronted with the real world of labour during vocational education. What role do teachers play in this confrontation? Is the measure of professionalism, sensitivity and promptness of teachers a sufficient guarantee of quality transition of vocational education graduates to the world of labour? Or, are the students exposed to media pressure, information and communication technologies and social networks in which teachers do not have a clearly defined positive role? How do the students themselves evaluate their level of preparedness or qualifications for labour performance after their studies? The real quality of vocational education only the future will check. However, the analysis of contemporary opinions of students can be a significantly positive stimulus for the future.

Keywords: Vocational education students, Life expectations, Teaching methods, Quality of education

Introduction

To see me does not necessarily mean to see my face.
To understand my thoughts is to have seen me.

Mustafa Kemal

Vocational education has a special and irreplaceable place in the educational system of every country. The continuous transition of graduates into the world of work depends on its quality. Vocational education, on the one hand, is based on the pillars of general and vocational-theoretical education, on the other hand, it is its natural outcome, with the fact that it reflects on the world of work and consistently cooperates with it.

The vocational education system logically and meaningfully carries out the specific and non-specific transfer of theoretical education to the world of work - not only through practical exercises, workshop teaching, laboratory and design exercises, but above all through the implementation of professional practice. Professional practice is realized in the real world of production and work. The world of work is a necessary feedback for vocational training. The future professional life of graduates of vocational education in the world of work and their meaningful application in professional life depends to a large extent on the quality of professional practice carried out within the entire study process. The level of sensitivity and alertness with which vocational

education is able to respond to developments in the world of work will be reflected in the quality or poor quality of future professionals. And none of us doubts the need for qualified professionals.

In the present time, which is characterized by rapid changes in science, technology and society, the role of professional education is increasingly necessary. Only the future will check the quality of education, therefore forecasts of developments in the world of work as a whole as well as in individual professions and on the labour market are very important for professional education. The content of the curriculum and teaching methods must be adapted to what the graduates will need when transitioning from the world of education to the world of work and when applying in it. Education must provide them not only with immediately applicable knowledge and skills, but also such equipment that will not allow them to remain at the level of development achieved, will allow them to further their education, develop their skills, know how to solve problems.

Contact with the world of work, which should lead to the acquisition of adequate abilities and skills, is a professional matter and cannot be ensured to the necessary extent only by schools as part of their teaching. Therefore, teaching at secondary vocational schools is carried out in two parallel areas - in the theoretical preparation of pupils and in vocational training. The result of the mutual symbiosis of these two levels is the coordination of the theoretical and practical components in such a way as to ensure the growth of manual skills and related professional knowledge. The added value for students is the gradual learning of the world of work, its economic indicators, as well as its organization, planning and management.

Therefore, teaching at secondary vocational schools is carried out in two parallel areas – in the theoretical preparation of pupils and in vocational training. The result of the mutual symbiosis of these two levels is the coordination of the theoretical and practical components in such a way as to ensure the growth of manual skills and related professional knowledge. The added value for students is the gradual learning of the world of work, its economic indicators, as well as its organization, planning and management.

A meaningful system from a human, but also an economic point of view, is only such a system in which changes are taking place and which has its own internal dynamics. A system can be defined as a whole composed of several parts arranged in a certain way. A characteristic element is the direct connection of these forms of education:

- theoretical education
- general education,
- vocational education,
- practical preparation of pupils.

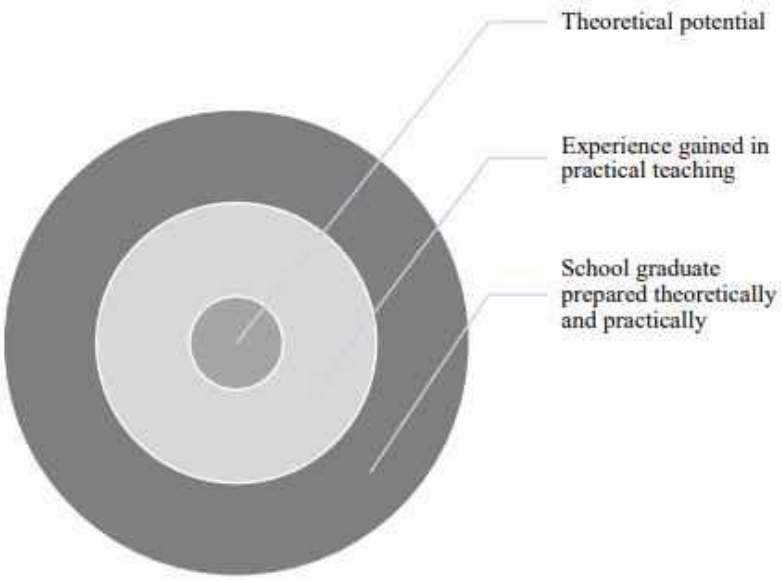

Figure 1. A typical element of vocational education is practical teaching, which takes place in the premises of the company - a possible future employer. This method guarantees that the training of students will be sufficiently satisfactory for the employer. Pupils can thus familiarize themselves directly with the future workplace, the way of working, technologies and customary work procedures.

Schools involved in the vocational education system cooperate with private companies and together set educational programs and curricula. The meaningfulness of such vocational training lies primarily in its connection to the current needs of the labour market. The vocational education system itself can be set up and implemented in teaching and study fields at all levels of education. The basic condition is to set the system in such a way that the minimum number of hours of practical training is observed in proportion to the overall total scope of teaching. The minimum scope is defined by sample lesson plans.

The main aim of our contribution is to use qualitative research to examine the strategies of vocational education, to identify factors affecting the course of activities at the relevant workplace. At the same time, seek an answer to the question of how best get feedback and assess the degree of effectiveness and meaningfulness of the work, so that the aims of vocational education can be fulfilled.

Method

The conceptual apparatus of scientific disciplines has been expanded in recent decades not only by quantitative but also by qualitative research. Quantitative research works with a large sample of respondents, hypotheses are statistically verified at the level of significance with justifiable validity and reliability. The scientific community of social-scientific disciplines is subjecting the world of numbers and quantification to criticism more and more urgently. The main argument is criticism towards the choice of dependent and independent variables, influencing numerical interpretations by unpredictable factors (intelligence, delinquency, etc.), weak or no contact with people or with the "research field" and, last but not least, hypothesis testing with statistical logic. The argumentation about the inappropriateness of quantitative research in social science disciplines is presented below.

Qualitative Methods

The main characteristic of quantitative methods are:

- suitable more for natural sciences;
- distortion of "measurable" phenomena by unreliable concepts;
- inappropriately interpreted correlations;
- result in quick fixation – no contact with people or terrain;
- no contact with people or terrain;
- inappropriately defined dependent and independent variables;
- testing of hypothesis affected.

Compared to quantitative research, the strength of qualitative research lies more in extensive, descriptive narratives than in the creation of statistical tables. Qualitative research is primarily characterized by "immersing oneself in the problem", it does not work with a large number of respondents, it can often solve the case study of only one respondent within the framework of a qualitative research problem, while the validity and reliability of the research will be preserved if the research is set up correctly. The criteria for evaluating qualitative research are listed in the following table.

Table 1. Characteristics of qualitative methods

Evaluation criteria of qualitative research
Are the research methods appropriate to the nature of the question we are asking?
Can we clearly identify connections with existing knowledge or theories?
Was data collection and description of records carried out systematically?
Does the sensitivity of the method meet the needs of the research question?
Are the criteria used in case selection, data collection and analysis clearly described?
Does the research refer to accepted analytical procedures?
Is the analysis systematic?
Is there an appropriate discussion of how themes, concepts and categories were derived from the data as part of the research?
Does an appropriate discussion of the evidence for and against the researcher's claims form part of the research?
Are the data clearly distinguishable from their interpretation?

Results and Discussion

After the consultation and finalization, the following questions were the subject of guided interviews with the school management:

1. How do you evaluate the results of your professional practice so far?
2. What is in your opinion the most effective tool in vocational practice?
3. What is in your opinion the weakest element in vocational practice?
4. How should (could) the existing competences of the school, or superior bodies expand so that the entire process of organizing vocational practice improves ?
5. Who and according to what criteria decides on the selection of training workplace for vocational practice?

Qualitative research revealed a clear picture of the functioning of vocational practice in schools - practice that takes place year-round in a proportional connection of theoretical and practical teaching week after week appears to be significantly more meaningful. Vocational practice, which takes place as a continuous, uninterrupted period of several weeks to months, is significantly more characterized by an ambiguous definition of goals, the moment of control and feedback is formal, indefinite and clouded by a long time interval. Schools have to rely only on their management when carrying out vocational practice, national support is proclaimed only on a theoretical level.

Schools also create practice quality indicators themselves, while trying to create self-evaluation criteria that represent an effective means of ensuring the quality of vocational practice. When creating quality indicators, schools rely on the EQAVET system (European Quality Assurance Reference Framework for Vocational Education), the sequence of which can be presented in the sequence of planning, implementation, evaluation and creation of procedures for incorporating feedback and creating a structure of new goals. According to the respondents, the strongest element in practice is the practice mentor, who oversees the fulfilment of goals and deadlines.

In the context of improving practice, according to respondents, it is the most important to provide those professional qualifications that are able to meet the requirements of the labour market, another no less important indicator of quality is to promote educational success. The weakest practical tool from the students' point of view is individualization. The management of individual schools perceive lack of direction as the weakest point of practice, in which there is a lack of clear definition of who is responsible for certain activities.

In the paper we analyze students not only in the perspective of the meaningfulness of vocational practice, but also in the perspective of their own vision of themselves in the context of the meaningfulness of life. In agreement with Damasio, we examine students' attitudes towards themselves through projection into the future, into the values of life or motivational aspects. To determine the level of students' meaningfulness in life, we chose the so-called life meaningfulness scale intended as a valid tool for investigating especially the meaningfulness of life of young people.

This scale is composed of 18 questions. The respondent expresses on a five-point scale, the options for choosing an answer from 1 – I do not agree at all; 2 – I do not agree; 3 – I can't decide; 4 – I agree to 5 – I completely agree. The meaning of life scale has three dimensions (cognitive, motivational and affective), each of which contains 6 items (Halama & Semancová, 2014), while the individual items in the questionnaire were not arranged sequentially, but randomly alternating statements from the three areas.

The cognitive dimension is understood as the overall orientation in life, life mission or understanding of life. The cognitive component of the meaning of life represents a kind of cognitive image that includes not only a person's ideas about the world, but also about himself and his place in broader or narrower contexts. On the basis of an internal cognitive image or an internalized cognitive scheme, a person attributes a certain sense, meaning and adequate values to activities, phenomena, deeds in various life situations. A meaningfully added cognitive component indicates that the individual is aware that his life is organized, that he has a good philosophy of life, which is the basis of a full and balanced life. Such a person is aware of his life goals, his life mission. According to Halama (2002), on the contrary, with an underdeveloped cognitive component, a person has a feeling of emptiness, chaos not only in the world, but also in the closest sphere of his influence, he cannot find meaning in his activities, in various life situations, he feels existential anxiety, he has a fear of death, fear of responsibility. An individual with such an internal cognitive schema does not see the world as meaningful and coherent.

Motivational dimension refers to goals, plans, as well as the strength and persistence of commitment to them. The motivational component reflects ideas about the future world and one's own functioning, which a person transforms into goals and tasks that he tries to fulfill. Thus, he tries to invest energy in work and efforts so that the tasks he has set are fulfilled. He also decides what needs to be accomplished and what not, what is worth fighting for, what goal to strive for. These also include opposite tendencies: what should be avoided, what should be prevented. According to Halama (2002), the absence of goals to which a person devotes himself is accompanied by boredom, apathy, a person feels hopeless, that he cannot find goals, that he cannot persevere in them and that he is unable to resist obstacles in life (Verešová & Pohánka, 2008).

The affective dimension represents life satisfaction, fulfillment, optimism coming from experiencing the meaning of life or, on a negative level, disgust, feelings of monotony, etc. The affective component is related to the emotional component of the meaning of life. When a person has a positive idea about life, about the world, about himself, has set goals that he tries to fulfill despite obstacles and succeeds, he feels happy, cheerful and satisfied. He feels that his life is meaningful, fulfilled. If he fails to fulfill his life tasks, he feels sadness, unhappiness, anxiety, dissatisfaction, he may experience depression. He then evaluates his life as meaningless, mundane, longs for a new, different life (Halama, 2002; Halama & Semancová, 2014).

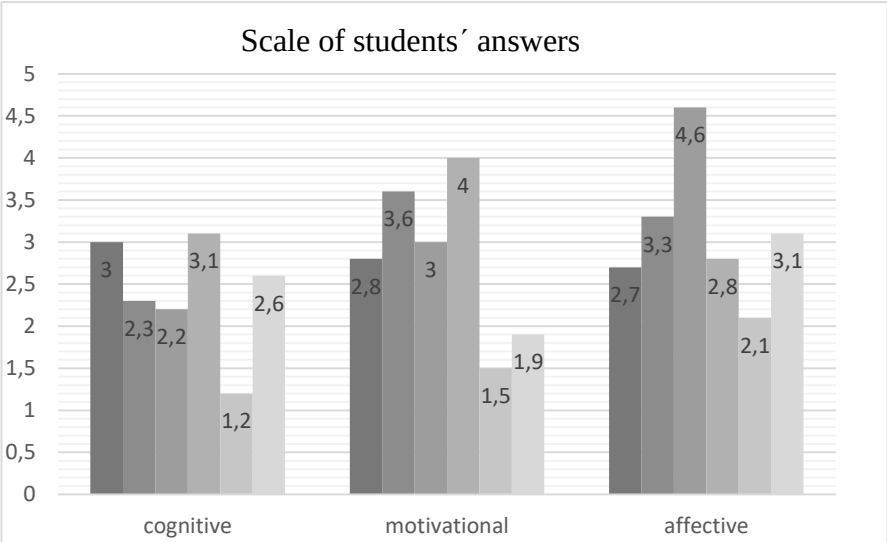

Figure 2. Scale of students´ answers

Cognitive component

1. I consider my life valuable and useful;
2. I managed to find a certain mission or role in life;
3. I feel that my life has a clear direction;
4. I do not understand at all why I am in the world and what I am actually living for;
5. I know what the ultimate goal of my life is;
6. I have a life philosophy or belief that helps me see meaning in life;

Motivational component

1. I do not really know what I want to do in life;
2. There are things in my life in which I am fully involved;
3. I do not have enough strength to do what I consider important;
4. I have several plans and goals in my life;
5. Obstacles and problems awaken new powers and abilities in me;
6. I have certain goals in life that I would like to fulfil;

Affective component

1. Life seems empty and worthless to me;
2. Disgust and apathy are a normal part of my life;
3. Life seems monotonous to me and I am mostly bored;

4. I am looking forward to what my life will bring in the future;
5. My life is full of interesting things;
6. I am satisfied with my life, even if it is sometimes difficult;

At the cognitive level, the maximum is represented by the statement *I don't understand at all why I'm in the world and what I'm actually living for.* Although respondents of controlled interviews were students in the age group of 16-18 years, this scepticism resonates negative and surprising. Similarly, other statements in the cognitive field concerning the directions of young people's lives reflect uncertainty and a kind of fear or disinterest in finding the courage to grasp the future clearly and meaningfully through one's own effort.

The motivational component achieves maximum in the sentence *I have many plans and goals in my life,* but obstacles and problems are not seen by young people as something that can be a driving force and a determinant of future success. Rather, they discourage them, make them uncertain, as if young people are not used to losing and do not know whether they want to fight for their success.

In the affective area, the statement "*Life seems monotonous to me and mostly bores me"* reached the maximum, and the minimum reached the statement *„My life is full of interesting things".* This situation is a very urgent challenge for us teachers and, last but not least, for parents. Young people seem to live a very comfortable and good life, while lacking a degree of awareness of this condition. Young people have "lost themselves" in the context of consumerism and adult care. They have acquired everything in life easily, and the moment of their own effort remains blurred, without clear contours of their own activity and effort. Probably, the attitude of not only parents, but also us teachers is underpinned by this state. We forget that endlessly making everything easier for young people, helping them, trying to solve problems for them, emphasizing only the pleasant side of life for them, is ultimately counterproductive and harmful for the young generation. Knowing how to say "no", knowing how to be appropriately strict, requiring adequate activity and expenditure of energy for qualitative growth in theoretical and especially practical training in vocational education is an urgent challenge for the present and the future.

Conclusion

Active and meaningful life, professionalism or a full-fledged orientation towards the future - that is the self-reflection of students. If the students' motivation for the future is in many ways unconvincing, it is desirable to analyze the conditions in the school. Are we teachers doing enough to gradually reveal to young people the path of their direction?

The quality of the future can only be built by teachers who create in their students not only the required system of knowledge and abilities, but who create and patiently build respect for wisdom as a strenuous intellectual activity in students. By respecting the wisdom of the students, the teacher shows them authentic human freedom, understanding that freedom is above all a huge force of responsibility. And responsibility towards the students is transparently manifested in respect and understanding of the never-ending interconnectedness.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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A Comprehensive Evaluation of an Internship Program: A 360-Degree Review Involving Students, Host Organization Supervisors, and Faculty Members

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Abstract: In 2017, the School Education Act of Japan introduced a new category of higher education institutions, called "Professional Universities". These institutions are mandated by law to allocate a minimum one-third of the credits necessary for graduation to participate in practical training. During 2022-2023 academic year, the Faculty of Information at Kaishi Professional University (FI/KPU) established a robust internship program. Second-year undergraduate students participated in an internship program for five weeks (equivalent to 150 hours), while third-year students undertook for fifteen weeks (equivalent to 450 hours) with a diverse range of host organizations. The program's goal is to provide students at Kaishi Professional University with real-world exposure, preparing them for successful careers upon graduation. To assess the internship program's performance, the steering committee of internship program collected questionnaire feedback from all stakeholders involved, student interns, host organization supervisors, and faculty members. Analysis of this feedback offers insights into how the internship program influences the professional and personal growth of student interns. This assessment takes the form of a 360-degree review, encompassing perspectives from host organizations, students themselves, and faculty members. The study includes a descriptive analysis examining the correlation between student satisfaction with the internship

experience and the host organization's satisfaction with student abilities. The result of this analysis shows how the internship program impacts on professional, personal growth of intern students.

Keywords: Professional Universities, Kaishi Professional University, Intern students

Introduction

In the late 1990s, the Japanese government recognized the significance of internships as a means to provide students with practical experience and knowledge in the workforce. The Ministries of Education, Labour, and International Trade and Industry collaborated to promote internships, formalizing their agreement in September 1997. This marked an important milestone in the recognition and support of internships in Japan.

The official use of the term "internship" in a government document came in January 1997 through the Program for Educational Reform: Toward the Realization of an "Educated Nation." This document laid the foundation for the subsequent launch of internships in Japan, which gained further momentum with the Action Plan for Economic Structural Reform in May 1997. Fast forward to 2013, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) released a report emphasizing the promotion of internships for educational purposes. The report highlighted the importance of medium- to long-term overseas internships as well as internships with various formats, including those tailored for younger undergraduates and integrated with project-based learning (PBL).

While internships are now widely recognized as valuable for students' preparation for the workplace, their assessment in higher education has gained increased attention from educators and policymakers. Understanding the impact and effectiveness of internships is crucial for evaluating students' growth and ensuring meaningful learning experiences. However, despite the recognition and promotion of internships, the participation ratio in credited internship programs in Japan remains relatively low. A survey conducted by both the public and private sectors revealed that in 2019, only 3% of bachelor students participated in internship programs. Furthermore, the majority of internships lasted less than two weeks, with over 70% falling into this short duration. Around 90% of students were involved in internships for less than one month. Such brief internships provide limited opportunities for meaningful learning and development, making it challenging to assess the growth and impact on students.

In response to this issue, the paper proposes best practices for assessing long-term internships and introduces the concept of a 360-degree evaluation approach. This approach involves gathering feedback from multiple parties involved in the internship process, including supervisors, faculty members, and the students themselves. The paper analyzes questionnaire feedback from all parties to provide insights into effective assessment methods and ensure a comprehensive evaluation of students' internship experiences. By implementing these best practices, it is hoped that internships in Japan can be better evaluated, leading to enhanced learning outcomes and improved preparation of students for the workforce.

Framework of Study

Stakeholders of the Internship Program

The primary stakeholders of an internship program are student interns, faculty advisors (professors) and internship supervisors at the host organization as shown in (Figure 1). Each plays an important role in ensuring that students gain valuable experience and knowledge from their time as interns.

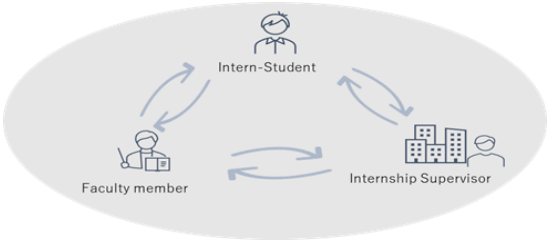

Figure 1. Primary stakeholders of Internship Program.

Internship Supervisor

The internship supervisor is responsible for overseeing the student intern's work experience and providing guidance and support throughout the program. They play a crucial role in facilitating the student's professional growth and development by exposing them to real-world situations, offering constructive feedback, and providing opportunities for hands-on learning and skill development. Additionally, the internship supervisors are responsible for evaluating the student's performance and ensuring that they meet the academic requirements of the internship program.

Faculty Member

The faculty member acts as a liaison between the student, the internship organization, and the academic institution, ensuring that the internship aligns with the student's academic goals and learning objectives. The faculty member also plays a critical role in assessing the student's progress and evaluating their performance, drawing on their expertise in the subject matter and experience in higher education.

Student Intern

The student is the main actor in an internship program and is responsible for actively participating and making the most out of the opportunity. They have to take ownership of their learning experience and show initiative in their tasks and projects. It's also important for the student to communicate effectively with their supervisors and colleagues, ask questions, and seek feedback to continuously improve and meet the objectives of the internship program.

Internship Program Structure at Faculty of Information/ Kaishi Professional University

Faculty of Information/ Kaishi Professional University (KPU) has sent 57 second year and 66 third year students to 45 industry partners as interns in the 2022/2023 academic year. This is the first-round full-scale implementation of the internship program at KPU ("full-scale" means both 2nd and 3rd year students join). Details framework of the whole internship processes is discussed in (Pann et al., 2022). The second-year students participated in an internship of five weeks (150 hours, from late September to the end of October), while the third-year students had fifteen weeks (450 hours, from late September to the end of January). During this period, interns were given a chance to gain valuable knowledge and experience about their chosen field through hands-on experience with real world projects at the leading companies. Interns' work time and their activities had been recorded by themselves every day in an online journal form and verified by their supervisors using a Web-based Daily Reporting System called "Cam-Tore". In addition, faculty members make on-site visits several times during internship and monitor students' working conditions and progress of work. After the completion of the program, students make a summary report of their work and send it to their supervisors. This report may contain confidential information and not disclosed to even faculty members. Students also send a separate report (in 2-page poster presentation format) to faculty members. The latter report does not contain confidential information and can be distributed openly. After the completion of all programs, a one-day long symposium is organized. It was attended by all students, all faculties. All supervisors are invited and almost all host organizations send representatives. 1st year students are invited as well to learn about the internship program. Student Interns have to present their poster on this occasion. Finally, faculty members mark a grading to students based on intern student's evaluation, work journal record, findings during on-site visit, and the poster presentation. The yearly time chart is given in (Table 1) below.

Table 1. Yearly Time Chart of the Internship Program at Faculty of Information, KPU

Student	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1st year											Sy	
2nd year		G	G	P	P	PI	I	FQ			Sy	
3rd year		G	G	P	P	PI	I	I	I	I	FQSy	
Supervisor		C	C	C		S	S	S	S	S	QSy	
Faculty member		C	C	C			O	OGr	O	O	QSy	Gr

G: guidance and the following matching process, P: preparatory study for internship, I: internship, F: final report to supervisor, C: consultation and contract between host organization and university, S: supervision of interns, Q: assessment and questionnaire feedback, O: on-site visits of faculty member, Sy: Symposium, Gr: grading by faculty member

Sector and Size of the Host Organizations

Host organizations offer a diverse range of opportunities in terms of sector and size. Smaller companies can provide interns with an excellent platform to acquire new skills or refine existing ones. On the other hand, larger businesses often offer more extensive opportunities and abundant resources that are highly beneficial for career development. Moreover, host organizations are drawn from various sectors shown in (Table 2), including technology, manufacturing, business consulting, and others, such as finance, healthcare, and hospitality. This diversity allows individuals with a wide range of interests to find their ideal match within their chosen organization.

Table 2. Variety of host organization in sector and size (number of employees)

Sector size	ICT	Manufacturing/ Business Consulting	Others	Total
10,000 ≤	4(system integration, outsourcing)	2 (office equipment)	1(logistic, warehouse)	7
1,000 ≤	3 (Telecommunication, network solution)		1 (Construction management)	4
300 ≤	3 (Application development, IT supports)		2 (media, printing services)	5
100 ≤	13 (IoT services, ERP, Application/website development, research on AI)	6 (hardware manufacturing, job hunting consulting)	10 (health care, food & beverages, education services)	29
Total	23	8	14	45

Tasks Assigned to Intern Students

The tasks given to intern student's work varies depending on the business nature of a host organization as depicted in (Figure 2). According to the data, interns are mostly involved in internal business activities such as improving existing systems or developing new ones. Business planning development has less content among them.

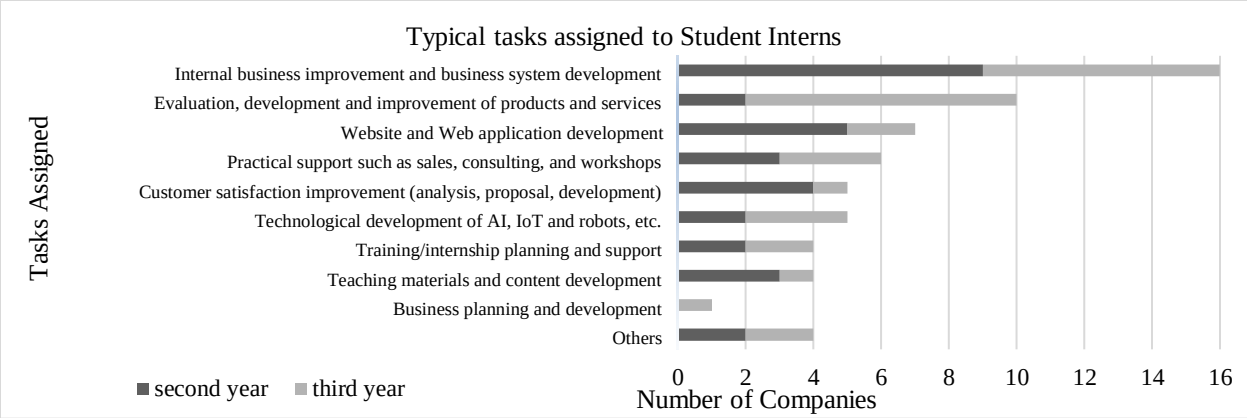

Figure 2. Typical tasks assigned to Student Interns

360 Degree Assessment

Diane et al. (2021) proposed a "A 360-degree review" approach. This approach expands assessment beyond the intern's performance. It proposes to include intern's assessment of host institutions and faculties, host institution's assessment of faculties, etc. Such multi-directional assessment might produce useful feedback for each stakeholder of the internship program and thus can contribute to the continuous improvement of the entire internship program. Based on this idea, the authors team, the Steering Committee on Internship Program at FI/KPU created a set of questionnaire forms and collected feedback from all stakeholders, student interns, host organization supervisors and faculty members.

Questionnaire to Student Interns

The questionnaire to student interns was composed of 33 questions. Questions are grouped in four main categories; Process, Outcome, Growth, and Challenge as described in (Table 3). List of questions is attached in ANNEX 1. In designing the questionnaire, the authors' team carefully considered objectiveness criteria. The team tried to make questions be answered in an objective manner as much as possible, not just asking respondents' mental satisfaction level. At least Process and Output groups are concerned, questions include many observable words such as "daily work review", "regular reporting", "polite language", "attendance", "delay", "a word of appraisal from the boss", etc. Regarding Challenge and Growth aspects, as many questions focus on the planning of respondents, i.e., the state of mind of respondents, it is difficult to completely realize objectiveness criteria. This version is the first version and will be elaborated on later. The answer was made according to a five-point Likert scale, ranging from 1 (very low) to 5 (very high). The questionnaire to students is mainly designed to get self-assessment feedback from students, but feedback information can be used also for program evaluation.

Table 3. Questionnaire to student interns for self-assessment (see ANNEX 1 for detail)

Process (10)	Process aspect focuses on "*How well did interns learn and be accustomed to the processes and procedures of professional work?*" This aspect includes ten questions about daily work review process, regular reporting and consulting procedure, data recording, polite language and attitude, team working style. etc.
Outcome (7)	Outcome focuses on "*Whether objectives of intern were met over a predetermined period of time or not*". It includes seven questions about attendance, delay record, observable outputs. Sense of accomplishment, word of appraisal, etc.
Challenge (8)	Challenge focuses on "How well did interns acquire attitude and preparedness to challenges?". It includes eight questions about clear carrier vision, preparedness, motivation, etc.
Growth (8)	Growth aspect focuses on "To what extent did they develop their working skills by working as an intern?" It includes eight questions about self-evaluation of skills in communication, time-management, problem solving, practice of business manner, cost consciousness, applicability of classroom knowledge to real world problems.

Questionnaire to Host Organizations

The questionnaire to host organizations has fifteen questions. These are divided into three sections. The first section is designed to get feedback from supervisors about the performance and attitude of Student Interns during internships. This section has six questions; skill level, capability to understand problems, changes during interns, task completion level and two work attitude questions (see ANNEX 2), which has corresponding parts in the questionnaire to students. The second section is designed to get feedback to overall assessment of the internship program structure, such as length, timing, the number of interns accepted, effectiveness of online supervision (if applicable). The third section is designed to give feedback to university-side performance. For details, see ANNEX 2.

Questionnaire to Faculty Members

The questionnaire to faculty members is not like ones to students nor to host organizations. At the point of evaluation faculty members have sufficient source data to give the final academic grading to students. Faculty members' source data includes supervisor's assessment feedback, work journal record verified by supervisors, his/her own findings during on-site visits, quality of poster contents and presentation, etc. There is no predetermined calculation formula on how to aggregate these different data to a single grading score. It is completely under the discretion of faculty members. Therefore, the questionnaire to faculty members does not cover student performance evaluation, rather focuses on evaluation of the internship program itself. The questionnaire simply asks "which aspect or achievement of internship program can appeal to society? ". Respondents are expected to return descriptive answers to this question.

Questionnaire Feedback Results

Self-Assessment of Intern Students

Four graphs in (Figure 3) present the results of feedback from 2nd year students and 3rd year students respectively. As shown in (Table 3), four aspects, Process, Outcome, Challenge, and Growth have 7 to 10 questions. Average point for each aspect is calculated and the distribution of average point is shown in histogram. "Process" graph represents how well students learn and are accustomed to the ways and processes of how professionals communicate and work. "Outcome" graph represents to what extent the objective of internship was achieved. "Challenge" graph represents how well interns acquire attitude and preparedness to challenge. "Growth" graph represents the result of challenge, development of various skills, capabilities as a professional.

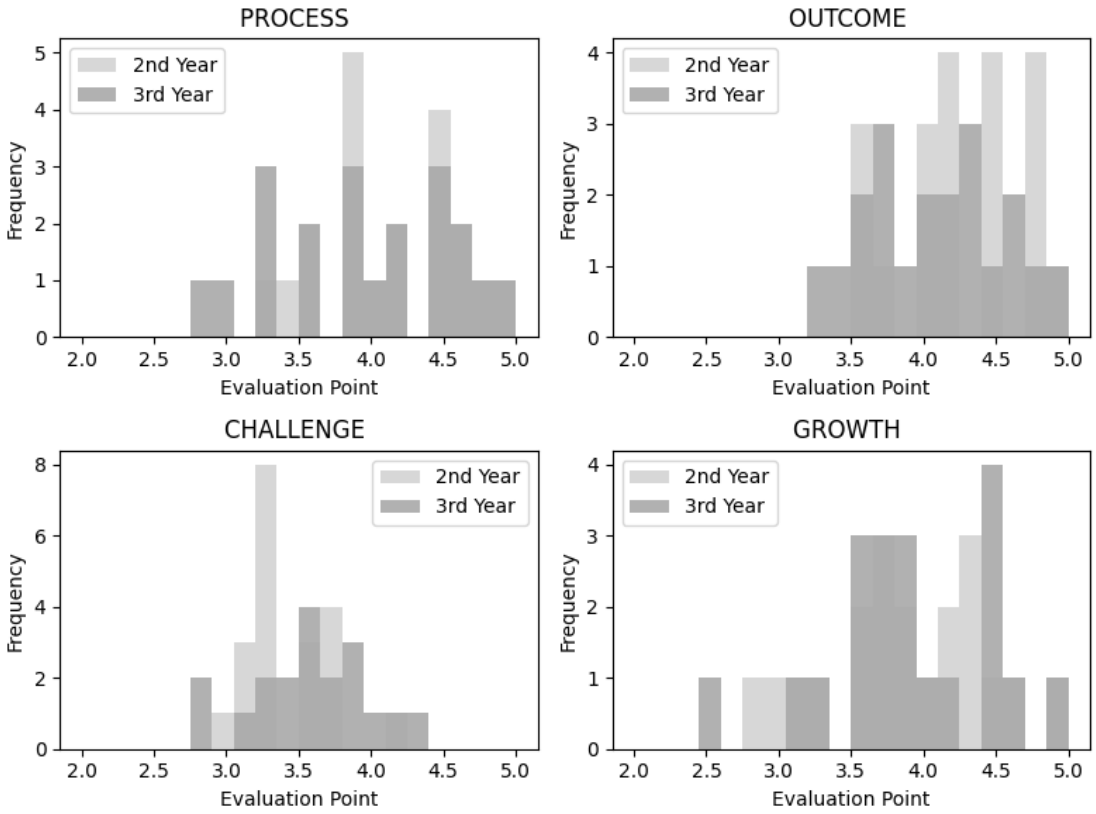

Figure 3. Self-assessment point of intern students

With more experience and exposure to the workplace environment, third-year students face greater challenges and attain better outcomes from their internship programs compared to second-year students, as shown in (Figure 3). This is because of greater maturity, knowledge, and skills they have acquired over time, allowing them to better navigate the challenges and opportunities presented by the internship program. As a result, third-year students may have a deeper and more meaningful learning experience during the internship, leading to better outcomes and improved professional development. Additionally, it is noteworthy that second-year students may face more significant challenges during their internships, primarily due to their comparatively limited prior experience in professional settings.

Student Self-Assessment versus Supervisors' Assessment

For the questionnaire results by the host organization to interns, we set -4 to +4 to each answer of six sections, so that the maximum point will be 24 and the lowest point will be -24. This grading system is designed to provide a quantitative assessment metric about the students' performance across multiple sections.

Figure 4 depicted the evaluation points of the host organization supervisors and the intern's self-evaluation points. Two questionnaires have a corresponding set of questions, and it can expect similar evaluation scores for these two metrics. The correlation coefficient between two evaluation scores, however, is very small (0.10 for second year, -0.14 for third year students). To gain a deeper understanding of this phenomenon, further investigation is needed. Authors are conducting a detailed analysis that takes into account factors such as the business nature of the host organization and the specific tasks assigned to interns and plan to elaborate on this supplementary research in an upcoming paper.

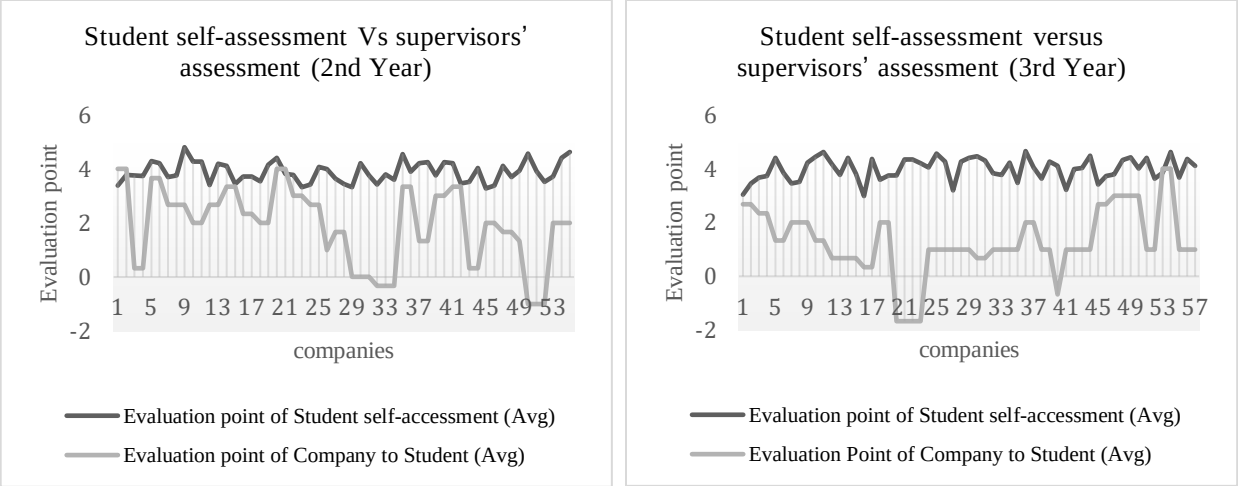

Figure 4. Correlation between supervisors' evaluation and self-evaluation of student

The questionnaire results by the host organization to university side performance showed 100% satisfaction level. It is indicated that they are highly satisfied with the response and communication with the faculty members and staff of the university regarding the internship program.

Assessment of Faculty to Interns Students

As described in above, the final assessment of faculty members about student academic score is done by considering various materials; supervisors' feedback, work journal record verified by supervisors, faculty members' own findings during on-site visit, poster presentation, etc. In this evaluation process, fairness is most important.

The journal record includes a short summary of students' daily work and questions from students to supervisor. Working hours are also precisely recorded. Monitoring includes site visits of faculties at least two times for the second-year students and four times for the third-year students during the internship. At the exit point of the internship program, the final presentation by interns attended by relevant staff of the host organization is organized. This occasion is usually not open to outside members. Only responsible faculty members are invited.

From the viewpoint of fairness, the final poster presentations are most important. Presentations are given on the day of the final symposium. Student interns compile the final report to faculty members in A1 size poster of predetermined format. It contains details of tasks, work process, output of work, findings, what is learned, etc. This poster is checked by the supervisor to avoid unintentional release of confidential information. The faculty members can understand many things by viewing posters and discussing with presenters. The poster presentation event also provides a chance of "multiple eyes review". Based on those inputs, responsible faculty members give a final score to students. But as of the date of this paper submission, the student academic score is not finalized.

Conclusion

Kaishi Professional University has taken a step forward by successfully sending one-hundred and three students to forty-five different host organizations for internships. This is a major accomplishment that demonstrates our commitment to providing our students with meaningful opportunities to gain hands-on work experience. It is a challenging task to involve the internship for longer periods of time and those at earlier grades in university studies. This study highlights how interns think about the growing of their professional and personal skills by taking part in internships.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Acknowledgements or Notes

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ANNEX 1. Questionnaire to student

Aspect	List of questions. Answer by Likert scale,1 – 5.
Process (10); way and process how professionals communicate and work	1. I have experienced a social life outside of the campus. 2. I have learned the daily work review/adjustment process. 3. I shared my progress everyday with my boss and fellows. 4. I was initiated to solve the problem. 5. It became a habit to record daily progress of work. 6. It became a habit to record and store data properly. 7. It became a habit to clarify the points of doubt quickly. 8. It became a habit to do regular reporting and consulting, and to keep polite language and attitude. 9. I helped fellows when I found them facing difficulty. 10. I can talk to senior fellows with little hesitance.
Outcome (7); tangible output	1. Complete attendance. 2. No delay in working days. 3. I have achieved a convincing and tangible output. 4. I got a good episode worth appealing in job-hunting occasions. 5. I got a sense of accomplishment and self-conviction. 6. I noticed my changes after internship. 7. I got a word of appraisal from IS and/or FA.
Challenge (8); attitude and preparedness to challenge	1. I got a better understanding about carrier prospect of myself 2. I got a more concrete idea about what I really want to be. 3. I got more concrete idea about aim of workplace and environment 4. The timing of the internship is too early. 5. The timing of the internship is too late. 6. I got an idea about ideal internship experience. 7. I got motivated by excellent fellow students. 8. I motivated fellow students.
Growth (8); improvement of working skills	1. I felt an improvement in communication skill. 2. I felt an improvement in time management skill. 3. I felt improvement in problem solving skill. 4. I felt improvement in data surveying and analysis skills. 5. It became a habit to practice business manners. 6. I felt an improvement in cost consciousness. 7. I applied classroom knowledge to solve real world problems. 8. I helped fellow workers and improved the performance as a team.

ANNEX 2 Questionnaire to Host organization

Aspect	Questions

Intern's performance (6)	Technical Skill Capability to Understand Problems Changes Rate after internship (attitude and skills) Task Achievement Rate Absent Days Delayed Working Time
Program design (4)	Duration of internship Timing of internship Number of interns received Online supervision
University side performance (5)	Overall Performance of University side Overall Performance of Faculty Members What kind of merits did you receive through internship? How many interns can you accept next year? Request for university? (if any)

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An Overview of Geometry Curriculum and Its Understanding by Albanian Students

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Abstract: In recent years, the Mathematics curriculum of pre-university education in Albania has undergone several reforms, which reflected changes in teaching and learning methods, but also in the reduction or expansion of various teaching topics. As a result, geometric topics have been the subject of these implemented reforms. Mainly, it is focused on geometric transformations, polygons, circles, geometric bodies, and two-dimensional vectors. Meanwhile, the curriculum of Geometry in programs such as Mathematics, Engineering, and Physics has not been revised by this reform. This paper aims to investigate the situation and to give ideas on methods and ways that have the potential to transform and reduce this gap that has been created in the treatment of Geometry in pre-university and university education.

Keywords: Geometry curriculum, Teaching method, Conceptual error, Procedural error

Introduction

Geometry plays an important role in teaching Mathematics. It begins in preschool education and continues until university education. The teaching of Geometry helps students to have confidence in their mathematical abilities, to be good problem solvers, and to communicate and reason mathematically correctly Ramlan 2016) for the fact that it is the best tool for the development of logical thinking. Geometry helps to understand concepts and solve problems in Algebra, Analysis, Probability, and Statistics and not only but also Physics, Chemistry, Informatics, etc. According to Bassarear (2012), Geometry is the subject that studies shapes, their relationships, and their properties. Recent studies have confirmed that students have difficulties understanding the concepts of Geometry (Ada &Kurtulus, 2010). These results are also identified in Albanian students, who have been under a new curriculum of Mathematics since 2010. The new curriculum of Mathematics contains fewer themes of Geometry in comparison with the old one. It is noticed that the study of ellipse, hyperbola, and parabola as a geometric set is absent. In addition, the student does not know lines and planes in 3D Geometry. Also, the concept of the vectorial product of two vectors is not given.

Due to these changes, it is seen that many students of Bachelor of Mathematics, Informatics, and Economics are faced with difficulties in learning several concepts of Geometry. Consequently, in this paper, we have identified the problems that students have in the implementation of the new curricula on geometric concepts.

The objectives of this study are:

1. The identification of difficulties and misconceptions of students related to geometric conception.
2. Analyzing the collected data by classifying them.
3. Giving ideas to overcome the gap between university programs and pre-university education.

Table 1. Themes related to geometry in the tenth grade of the new curriculum of mathematics are given in the table below (Fearnley et al., 2016)

10-th GRADE		
Themes	Concepts	Hours
Angles and polygons	Angles and lines	
	Triangles and quaditrals	2 hours
	Congruences and similarity	
	Angles of polygons	
2D Geometry	The measure of length and angles	
	The syprine of 2D shapes	2 hours
The Circle and geometric position	Circle	
	Circle Theorems	2 hours

Table 2. In the 11-th grade, themes, and concepts (Fearnley et al. 2016) are presented in

11-th GRADE		
Themes	Concepts	Hours
3 D Geometry	Geometric bodies	
	Volume of prisms	2 hours
	Total surface and volume of geometric bodies	
Graphs	The equation of a line	
	The graph of a parabola	2 hours

Table 3. Themes of geometry in 12-ve grade (Jefferson, 2019), are given in.

12-ve GRADE		
Themes	Concepts	Hours
Vectors	Definitions and properties	
	Coordinates of a vector	2 hours

Method

To achieve the goal of this study, a test was conducted. The target population was 12th-grade high school students and first-grade students of programs Bachelor in Mathematics, Informatics, and Economics. The participants of the champion were required to write their solutions in the test paper. The test was created based on the geometric knowledge that a student should have by his curriculum according to the method (Bassarear 2012). The duration of the test was 45 minutes. The methodology of this study consisted of collecting and analyzing data through descriptive statistics. Students' errors were categorized according to the classification of (Luneta 2015).

Results and Discussion

The test was completed by 192 of 12th-grade high school students and 87 university students. The test consisted of 5 questions. The two first questions were given to identify the misconceptions about 2D shapes and their relationship with 3D shapes. The purpose of the third question was to survey errors in location determination, reasoning, and geometric modeling for problem-solving. Question 4 intended to study the knowledge of students on vectors (part of coordinative geometry). The last question, Question 5 examined students' understanding of geometric transformations. Below, there are given the questions of the test and the results.

Question 1. $ABCD$ is a rectangle with length $AB = 6cm$, and diagonal $AC = 10cm$.

a. Find the perimeter and surface of $ABCD$.
b. Label and show elements of the obtained geometric body by the rotation of the rectangular around its length AB.

The answers' results in percent are given in the following diagram:

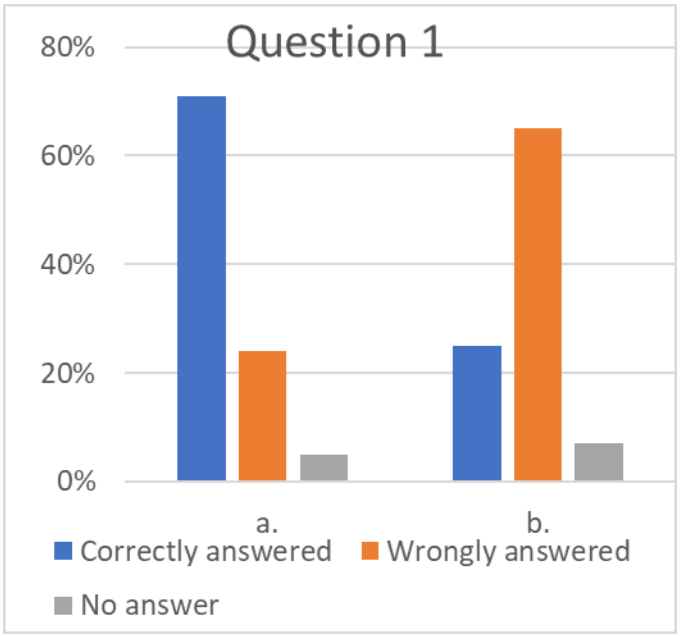

Diagram 1. Question 1 results

Question a. was solved correctly by 71% of students, 5% of them left the test blank and 24% solved it incorrectly or partially incorrectly. Question b. was solved correctly by 27% of students, 8% of them did not touch it at all, and 65% solved it incorrectly. In total, 25% of students solved the first exercise correctly, 5% of them did not touch it at all and 70% solved it incorrectly. 13% of students who solved incorrectly, Question 1, was made conceptual mistakes. They did not know the concepts of rotation, and cylinder. The others made procedural mistakes by applying Pythagoras Theorem incorrectly etc.

Question 2. The cuboid with dimensions 4 *cm*, 5 *cm*, and 8 *cm* is given.

a. List all pairs of parallel sides of the cuboid.
b. Sketch three openings of this cuboid.
c. Find the total surface area and volume of the cuboid.

The students' results are shown in the following diagram.

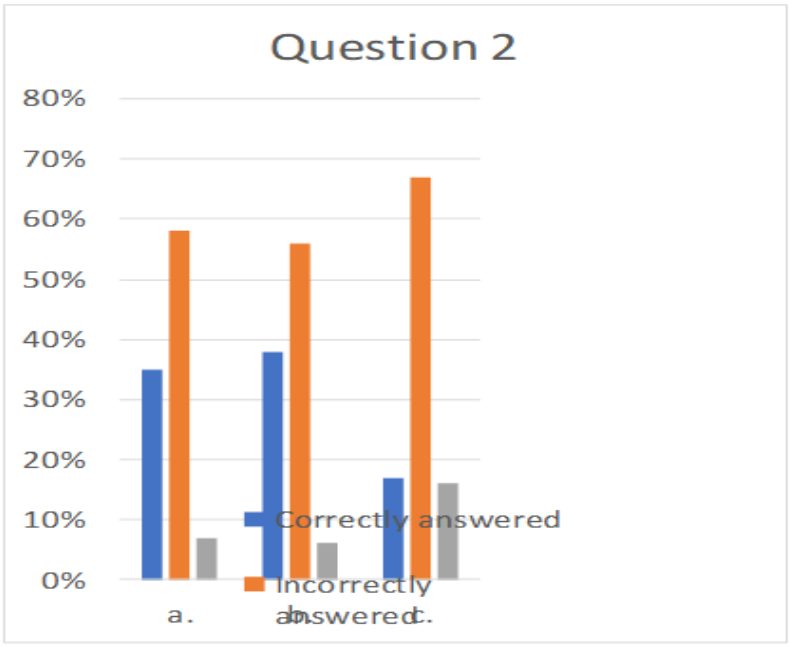

Diagram 2. Question 2 results

35% of the participants solved question a. correctly; 58% incorrectly and 7% left it blank. 38% of students solved it correctly; 56% incorrectly and 6% did not solve it at all.

Question c, 17% of them solved correctly; 67% incorrectly, and 16% left it blank. In total, 17% of the test participants solved the second exercise correctly, 5% of them left it blank and 72% of them solved the second exercise incorrectly. Conceptual errors made by students were 13%. Most of them do not know the concepts of the lateral surface and the total surface of the cuboid. 54% of students' errors were procedural (participants either opened the cuboid incorrectly or could not indicate 3 openings of it; also, they did not show all pairs of parallel sides).

Question 3. A ship sails from port O on a course of 30º for a distance of 50 km to reach port A. Another ship departs from port O on a course of 200º at a distance of 120 km to reach port B.

a. Represent the data in the rectangular coordinate system Oxy.
b. Find the course from port A to port B.
c. Find the distance between A and B.

Below, there are given results of students in percent.

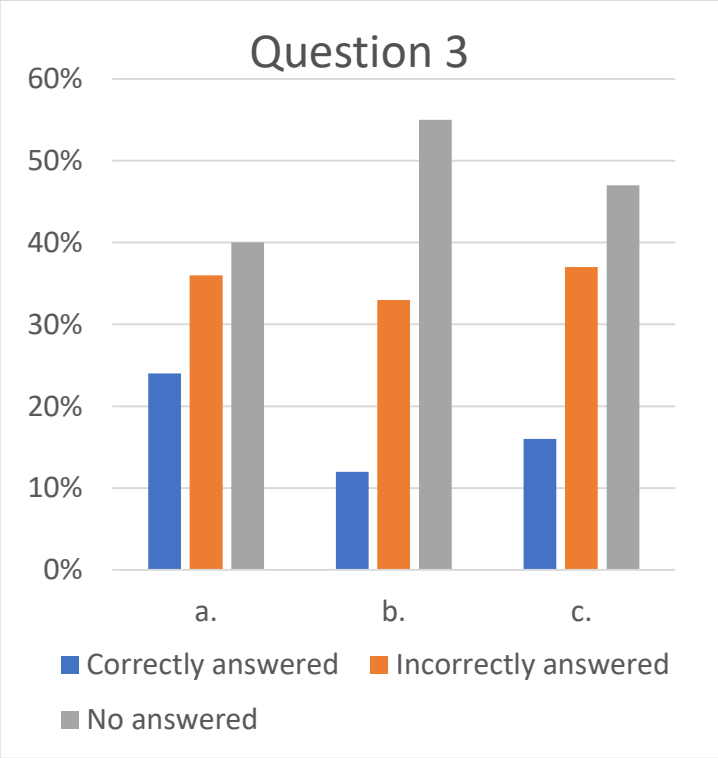

Diagram 3. Question 3 results

24% of participants gave a correct solution for question a.; 36% of them answered incorrectly and the other part of students did not give any answer.12% of students answered correctly to question b.; 33% of them answered incorrectly and 55% did not answer.

Question c., there were answered correctly by 16% of students; 37% incorrectly and 47% left the test blank.

19% of mistakes were conceptual (The students made mistakes, especially in the course' concept, they chose an oriented direction, the axe of ox). 27% of mistakes were procedural (the participants used inappropriate theorems to find the required elements, for example, they used Pythagoras's Theorem instead of the Theorem of cosine).

Question 4. Points *A*, *B*, and *C* have a vectorial radius $2\vec{\imath} + \vec{\jmath}$, $-i + 3j$, $\vec{\imath} - \vec{\jmath}$ respectively.

a. Draw the points *A*, *B* and *C* in a cartesian plane oxy and find the coordinates of vectors $\overrightarrow{AB}$, $\overrightarrow{BC}$ and $\overrightarrow{CA}$.
b. Evaluate the surface of triangle ABC.

Diagram 4 shows the results of students in percent.

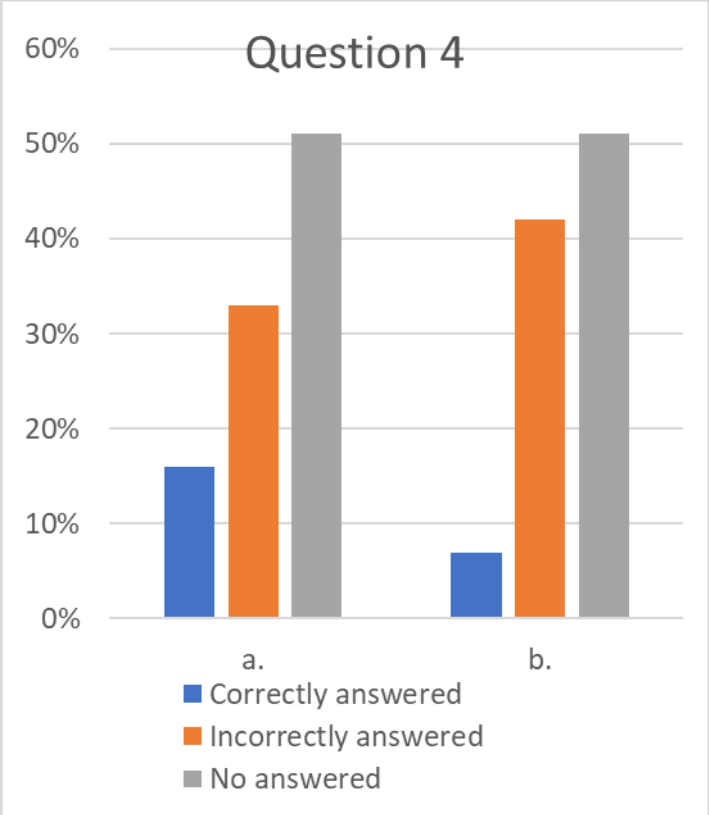

Diagram 4. Question 4 results

16% of participants gave correct answers for question a.; 33% of them answered wrongly or partially wrong and 51% of students left the test question a. blank.

Question b., 7% of students solved it correctly; 42% of them incorrectly, and 51% of participants did not answer.

28% of errors made in Question 4 were conceptual (Students did not know how to represent a vector as a linear combination of unit vectors $\vec{i}$, $\vec{j}$; and they wrote the length of vectors as a vector). 12% of mistakes were procedural. (The participants used height to find the surface of the triangle, and they took it as a bisector of a triangle.)

Question 5. LetABC be a triangle where $A(-1,2)$, $B(2,3)$, $C(5,0)$.

a. Draw the triangle $A'B'C'$ as an image of triangle ABC during a rotation with center O and angle 90º on anticlockwise orientation.
b. Draw the image $A''B''C''$ of triangle $A'B'C'$ in a symmetry respect to line $y = x$.
c. Describe the geometric transformation that transform triangle ABC to triangle $A''B''C''$.
d. Show the relationship between elements of triangles ABC, $A'B'C'$ dhe $A''B''C''$?

The results of students' answers are given below:

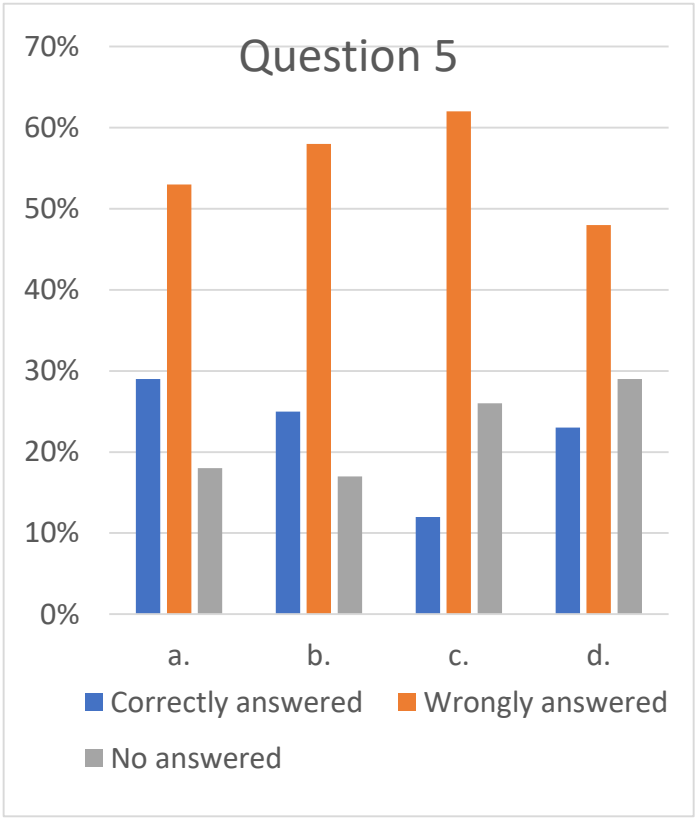

Diagram 5. Question 5

29% of partcipants answered correctly; 53% of students solved the question a. İncorrectly, and the others left it blank. Question b, 25% of students sketched correctly the image of triangle $A'B'C'$ during the symmetry with line $y = x$; 58% of them drew it wrongly and 17% did not give any answer. The results for question c. showed that there were a few students that solved it correctly, only 12% of participants; 62% of them gave wrong or partially wrong solutions. For question d., 23% of participants gave the right answer; meanwhile, 48% of them left the question blank. 52% of mistakes in Question 5 were conceptual (mainly, the participants did not have clear concepts of rotation and line symmetry. Most of them did not determine the geometric transformation that is used when preimage and image were given.

The other mistakes were procedural. The students used the wrong properties to show the relationship between elements of preimage and image during a geometric transformation. They had difficulties to determine the composed transformation.

Conclusions

In this paper, there are shown difficulties of students in geometric concepts related to the Albanian new curriculum of Mathematics. The study shows that high school students struggle with perception of geometric concepts. Furthermore, the students, manifest problems with the procedure in solving a geometric exercise. There exists a handicap between learning geometric concepts and using them in several geometric situations. As a result, abstraction, the third Van Hiele level is not understood by the students. It is noticed that the right or wrong solutions of exercises are not explained with words, consequently, there exists a lack of geometric expressions on the part of students.

Recommendations

According to this study, students need to avoid mistakes in perceiving geometric concepts and solving geometric problems. We recommend:

1. The implementation of Van Hiele's levels at least up to the level of abstraction (Van Hiele 1986) in explaining geometric concepts and solving geometric problems by the teacher.
2. Using the learning of geometric conceptions and properties intertwined with technology.
3. Ask the student for an explanation of the solution of an exercise.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS Journal belongs to the author.

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Developing Research and Academic Competencies of Students through Three Cycles of Studies

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Abstract: One of the primary goals of university education is to develop research and academic competencies of students as key factor for their academic success and further professional career. European strategic documents on education also stress the importance of these skills as an immanent part of generic skills of students. The aim of this paper is to present how research and academic skills of students are acquired through the three cycles of studies starting from the undergraduate to the doctoral level of studies. For this purpose, we first review the definitions of the research competencies in relevant papers and documents, so that we are able to identify which skills, values and knowledge university student should possess to be considered as competent to do research. Then we analyze to what extent courses for developing of research competencies are incorporated in the university education for pedagogues, educators and teachers, as well as how global research trends and tendencies affect the content of curricula and training. We can conclude that reforming of curricula in the past decades continuously enhanced the research skills of students through the university education at all three levels. Yet there is much more that has to be done in terms of better organized programs, gaining good research practice with introducing of peer mentoring, taking advantage of information technology which will include virtual classroom strategies for research, and strong cooperation with research institutions.

Keywords: Research skills and competencies, Academic competencies, University study programs

Introduction

Developing research and academic competencies of students is one of the primary goals of university education as key factor for their academic success and further professional career. Definitions and frameworks for research competencies can be found in various strategic documents, reports, and guidelines published by international organizations, governmental bodies, and educational institutions. These definitions emphasize a combination of knowledge, skills, and attitudes necessary for conducting quality research in various research-related areas.

The *aim* of this paper is to present how research and academic skills of students are acquired through the three cycles of studies starting from the undergraduate to the doctoral level of studies. For this purpose, we made desk research to review the definitions of the research competencies in relevant papers and documents, in order to identify which skills, values and knowledge university students should possess to be considered as competent to do research. Then we analyse the current situation in Macedonia and conclude how courses for developing of research competencies are incorporated in the university education for pedagogues, educators and teachers, what the effect of global research trends and tendencies on the content of curricula and training is, and what are the main challenges in the process of enhancing the research competencies through the academic studies.

Method

The paper is based on desk research using secondary data from relevant strategic documents. The sample for documentation analyses for the first part of study comprise of the relevant documents issued by European

Commissions, OECD, UNESCO, European Qualifications Framework (EQF), National Qualifications Framework (NQF), and other documents such as Bratislava Declaration of Young Researchers, The European Charter for Researchers, etc.

The sample for documentation analyses for the second part of study comprise of the university study programs for undergraduate, graduate and doctoral level that are currently use at the Institute of Pedagogy at the Faculty of Philosophy at Ss. Cyril and Methodius University in Skopje, as well as the other three faculties for teacher training in the Republic of Macedonia (Bitola, Shtip, and Tetovo).

Results and Discussion

Definitions of the Research Competencies in the Strategic Documents

Research competencies in the European context and in other strategic documents are often defined in alignment with the broader goals of education, research, and innovation policies. These definitions emphasize a combination of knowledge, skills, and attitudes necessary for conducting high-quality research. While specific terminologies and emphases may vary, common characteristics can be identified across various European and international strategic documents where competencies are viewed as a holistic concept defined as knowledge, understanding, skills, values, beliefs and attitudes. (European Commission, 2013)

Based on the comparative analyses of documents published by the most relevant bodies such as the European Qualifications Framework (EQF), the European Research Area (ERA) Framework, and documents from the European Commission (European Commission, 2020, 2020a, 2021), UNESCO (UNESCO, 2016) and OECD (OECD, 2018), we make list of eight key aspects that are often included in the various definitions of research competencies with the short description of each category:

1. In the frame of research competencies the candidates should possess *deep and interdisciplinary knowledge* that means competence in the fundamental theories, concepts, and methodologies relevant to the specific field of research as well as an ability to integrate knowledge from multiple disciplines, fostering a holistic understanding of complex issues.

2. *Methodological skills* such as proficiency in designing research projects, including formulating research questions, selecting appropriate methodologies, and planning data collection and analysis. Students should possess skills in gathering, processing, and analyzing data using quantitative or qualitative methods, as well as familiarity with relevant software tools. They should be able to critically evaluate existing research, identify gaps, and formulate innovative research hypotheses.

3. *Communication skills* that means proficiency in writing clear, concise, and scholarly research papers, reports, and proposals and other academic and scientific texts. They should be also able to present research findings effectively to the public, peers and specialized audiences. Skills in creating visual representations of data and research findings are also part of this category as a way to enhance understanding and engagement.

4. Researchers should take account of *Ethical and professional standards* in their work that means understanding the ethical considerations in research, including integrity, honesty, trust and respect for research participants' rights. Professional integrity refers to the adherence to professional standards, including responsible authorship, acknowledgment of sources, and avoiding plagiarism.

5. Capacity for *Problem-solving and innovation* is also defined as part of the research competencies that means ability to identify research challenges, develop hypotheses, and propose solutions based on evidence and analysis. Innovative approach means ability to generate novel and original ideas, technologies, or strategies that contribute to the advancement of knowledge and societal progress.

6. *Collaboration and networking skills* are immanent to the research competencies because they encompass ability to work effectively in research teams, fostering collaborative relationships with peers, mentors, and experts, participating in collaborative research initiatives and engaging in building professional networks.

7. *Lifelong Learning and Adaptability* are related to the research competencies as willingness and ability of students to be engaged in continuous learning, keeping up-to-date with the latest advancements and

methodologies in the field. Capacity to adapt to evolving research challenges, changing technologies, and interdisciplinary approaches are also crucial be a good and successful researcher.

8. Lately, with the emerging need for Open Educational Resources, definitions of the research competencies are expanding with the *open science skills and competencies*. As it is defined in the EC document named Providing researchers with the skills and competencies they need to practise Open Science: "Open science skills should be embedded within formal education from the earliest possible stage; these skills need to be embodied in all members of society…Open Science skills must be integrated within formal structured education through elementary school, high school and further and higher education – as well as through professional skills training and through lifelong learning. (European Commission, 2017, p.16.)

Furthermore, experts define four broad categories of open science skills:

- Skills and expertise necessary for open access publishing
- Skills and expertise regarding research data, data production, management, analysis/use/reuse, dissemination and a change of paradigm from "protected data by default" to "open data by default", respecting legal, and other constraints
- Skills and expertise to act in and beyond one's own scholarly and disciplinary community
- Skills and expertise resulting from a general and broad concept of citizen science, where researchers interact with the general public to enhance the impact of science and research. (European Commission, 2017, p.17)

Open access brings new opportunities, enables and facilitates the communication of scientists from various countries, increases the visibility of authors and the transparency of their work, spreads their research results, and reduces the possibility of plagiarism or unwanted duplication of research activities. Very soon, the openness of the research process will become a required component in the evaluation of research and research papers.

Researchers will be obliged to store their data and the entire research material including the statistical procedures and instruments in a space (a cloud) within the repositories and to make them available to the public. (Angeloska Galevska, 2022, p.23). In relation to this, the repository of the Faculty of Philosophy and the Ss. Cyril and Methodius University offers a precious collection in which scientific works created over decades have become permanently preserved and accessible to everyone. (Repository of UKIM, 2023)

Research competencies are outlined in national and strategic documents of the countries and internationally, worldwide. Most of the countries have National Qualifications Frameworks (NQFs) where the qualifications, including research competencies, are defined at different levels of education. Research competencies are also outlined within the policy documents, guidelines and curriculums of higher education institutions and research organizations as a goal that students have to accomplished. Although there are differences in the various definitions, the overarching goal is to prepare researchers with the diverse skills and knowledge necessary for contributing meaningfully to research, innovation, and society.

Analyses of the Academic Programs Related to the Development of the Research Competencies

Research competencies are developed progressively through the three cycles of academic studies: Bachelor's, Master's, and Doctoral degrees. Each cycle builds upon the skills acquired in the previous one, fostering a deeper understanding of research methodologies, critical thinking, and scholarly communication. Comparative analyses of the university programs highlight some general tendencies typical in developing and refining of research competencies through the three academic cycles:

Bachelor's Degree (First Cycle – Undergraduate level)

At the undergraduate level, students are introduced to the basic research concepts, methods, and principles. They learn how to conduct literature reviews, find out the stages of the research process, including formulating research questions, and understanding the importance of evidence-based arguments and the research ethics. Furthermore, students learn basic quantitative and qualitative research methods, data collection techniques, and basic statistical analysis. At the Institute of Pedagogy at Faculty of Philosophy in Skopje, obligatory courses of Methodology of Educational Research, Techniques for Educational Research and Statistics in Education are the main courses aim to develop research skills of students. (Faculty of Philosophy, 2023). In addition, there is also

an elective course in Inferential statistics and course in Evaluation that are related to these aims, especially in estimation of the reliability and validity of sources and data.
In all these courses there is also an emphasis on developing critical thinking skills, enabling students to evaluate existing research, analyze data, forming well-reasoned arguments and draw meaningful conclusions. Even though they are foundational courses, students are required to design research projects as condition for passing the exam. These experiences introduce them to the fundamentals of data collection and analysis.

Beside these courses, at the Institute of Pedagogy and other institutes at the Faculty of Philosophy in Skopje, there is also a course in Academic speaking and writing with aim undergraduates to develop essential communication skills through writing research papers, giving presentations, and engaging in classroom discussions (Faculty of Philosophy, 2023). Through this course student gain information literacy and become proficient in accessing and using academic databases, libraries, and online resources to gather information for their seminar works, term papers, or research proposals. Undergraduates conduct literature reviews to understand the existing body of knowledge in their field of study, learning to synthesize information and identify key concepts and theories. They are also encouraged to do collaborative projects on different topics. Participation in group projects fosters teamwork and collaborative research, enabling students to learn from peers and develop interpersonal skills.

Master's Degree (Second Cycle - Graduate Level)

Master's programs delve deeper into research methodologies, where students learn more on advanced qualitative and quantitative research methods. They gain expertise in experimental design, survey construction, case studies, and data analysis techniques. Depending on the module they had selected (Pedagogy, Educational management, Management of human resources), master's students often explore a specific field of study, and develop specialized research skills tailored to their area of interest.

In writing their master thesis, graduate students are obliged to conduct advanced and in-depth literature reviews, identifying gaps in existing research, learning to critically analyse scholarly articles, formulating research proposals for their theses or projects, and contribute to the academic discourse. Furthermore, they should be capable to conduct an independent research project, starting from the phase of choosing an appropriate problem, developing a research design, execution of theoretical and empirical research, and reporting on a substantial research endeavor. Through all these phases they are supported and leaded by their mentor but still have to apply their research skills in a more autonomous and comprehensive manner.

At the Institute of Pedagogy at Faculty of Philosophy, beside the course in Research Planning that has a compulsory status, four additional courses are offers related to the development of the research competencies: Qualitative research methods, Quantitative research methods, Statistical Analyses, and Evaluation of the teaching process. (Faculty of Philosophy, 2023).

Master's students are also obliged to public presentation of their research findings to the academic committee, peers and faculty, enhancing their presentation and communication skills. Some master's programs offer training in scientific writing, including drafting research papers and grant proposals, preparing students for academic publishing and funding applications, and that is recently done at the master programs at the Faculty of Philosophy in Skopje with addition of the course in Academic writing of scientific papers within some of the modules (Faculty of Philosophy, 2023).

Doctoral Degree (Third Cycle - Postgraduate Level)

Doctoral programs provide comprehensive training in advanced research methods, focus extensively on developing advanced academic and research competencies. Doctoral candidates conduct original, in-depth research projects, making a significant contribution to the existing body of knowledge in their field. Doctoral candidates are expected to conduct independent and original research, addressing critical questions or problems in their discipline. They design and execute complex research projects, often leading to publications in peer-reviewed journals.

All PhD candidates at the University Ss. Cyril and Methodius in Skopje are obliged to pass obligatory courses in Research Methods and Research Ethics as the first generic courses and to choose further among other offered generic courses. A strong emphasis on research ethics is placed at the doctoral level, ensuring the responsible

conduct of research. Further in their studies in the doctoral program in pedagogy, majority of candidates choose the courses in statistics feeling lack of knowledge from their prior education in analysing research data. Quantitative and Qualitative Research Methods is also one of the most chosen courses within the doctoral programs. Within these courses doctoral students receive specialized training in advanced research methodologies, including advanced statistical analysis, experimental design, qualitative data analysis, and mixed-methods approaches.

Doctoral programs at Ss. Cyril and Methodius University also foreseen obligatory participation of students at doctoral conferences where they should present research results accomplished during their studies in order to enhance scholarly communication. Doctoral candidates hone their skills in frequent academic communication with their professor and peers, presenting their research, publishing in academic journals, and defending their dissertations before an academic committee. They are expected to demonstrate critical thinking, innovation, and creativity in their research, pushing the boundaries of knowledge in their field.

Throughout these academic cycles, research competencies are not only developed through formal coursework but also through hands-on research experiences, collaboration with faculty and peers, and active engagement in the scholarly community. Collaboration with peers and experts in the field enhances their research perspective. By the time students complete their doctoral studies, they are expected to possess advanced research competencies, enabling them to make significant contributions to their field and pursue careers in academia, research institutions, industry, or government sectors.

During their studies, PhD candidates work closely with experienced mentors, receiving individualized guidance and support throughout the research process. One mentor can have maximum three PhD candidates. Sometime they also serve as teaching or research assistants, practicing and improving their mentorship, research and leadership skills. Related to this, many doctoral programs involve opportunities for students to gain teaching experience, allowing them to mentor undergraduates and master's students.

Doctoral students are also encouraged to interdisciplinary and international collaboration, to communicate and cooperate with scholars from diverse fields, expanding their perspectives and approaches to research. They are obliged to have at least one-week mobility to another University and do research work related to their topic. In order to make this process easier in year 2023 new CEEPUS network named Empowering social dimension of education through quality teacher education development research (SOCTED) is established between six universities aiming to enable mobility of academic staff and PhD candidates. The major aim of this CEEPUS network is to promote an innovative exchange of research and mentoring in the field of the social dimension in teacher education (CEEPUS, 2023). Such a projects have great benefit for successful academic accomplishment of studies, by broadening students' research horizons and fostering innovative approaches.

Within the academic programs for educators and teacher training at Macedonian faculties, in order to enrich and expand the research work, more courses on quantitative and qualitative research methods are offered to students at master and doctoral level. However, “there is a worryingly high number of study programs at teacher training faculties in Macedonia that have been noticed to have unsatisfactory or a total lack of coverage of methodological subjects… It is especially useful that students, even at the graduate level, are encouraged to do applicative and comparative research. In addition, the University, Faculties and Institutes should work on continuous creation of electronic databases for research in separate scientific fields, as well as databases for MA and PhD work.” (Angeloska Galevska, 2016, p. 93). During their studies students are expected to publish their research findings in peer-reviewed journals and present at conferences. This disseminates their work to the academic community and beyond. Training the young university staff in planning and implementing scientific research, as well as writing articles and reports according to academic standards is significant for the ranking of the universities and faculties, where one of the main criterion is the conducted research and the published reports of the research results in renowned professional and scientific journals. “The main problem of the university is that the academic staff is quite old on average, and there are fewer and fewer young assistants and researchers who will be able to contribute to the future development of research, and consequently to the better ranking of our universities.” (Angeloska Galevska, 2022, p.24). Existing conditions are critical and imply urgent need for engagement of young researchers and collaborates on the state universities in Macedonia.

Conclusion

Research competencies are outlined in national and strategic documents of the countries and internationally, worldwide. They are also defined within the policy documents, guidelines and curriculums of higher education

institutions and research organizations as a goal that students have to accomplished. Although there are differences in the various definitions, the overarching goal is to prepare researchers with the diverse skills and knowledge necessary for contributing meaningfully to research, innovation, and society.

Global research trends and tendencies affects the content of curricula and training and are successfully incorporated in the national curriculums in the Republic of Macedonia. Analyses of the curricula point out that throughout each cycle, students develop a deeper understanding of research competencies, from foundational skills in the bachelor's degree to advanced skills in the master's degree, and ultimately, the ability to conduct independent, original research at the doctoral level. Doing research on the foundations of methodology and practical training for research work during the first cycle is the basis for quality and in depth scientific works of research during the MA and PhD studies.

Throughout these academic cycles, research competencies are not only developed through formal coursework but also through hands-on research experiences, collaboration with faculty and peers, and active engagement in the scholarly community. The progression through these academic stages allows individuals to build a strong foundation of research expertise and prepares them for successful careers in their field of interest. Moving ahead through these cumulative academic process, students develop increasingly sophisticated research competencies, equipping them with the skills and expertise needed to engage in high-quality research, contribute to their disciplines, and pursue careers in academia, research institutions, industry, or government sectors.

Recommendations

Reforming of curricula in the past decades continuously enhanced the research skills of students through the university education at all three levels. Yet there is much more that has to be done in terms of:

- better organized programs,
- gaining good research practice with introducing of peer mentoring,
- taking advantage of information technology which will include virtual classroom strategies for research,
- developing open sciences skills and competencies,
- strong cooperation between research institutions
- urgent need for engagement of more young researchers at the state universities.

Creating productive research environment is of great importance. “As well as researcher diversity, we must consider the diversity of environments where the research is done, removing barriers to inter-disciplinarity. The current ‘publish or perish’ and hyper-competitive environment is toxic to the research endeavour as it encourages extreme individualism, and is linked to an increase in fraudulent science. Members States and the EC are enabling this. These issues need to be addressed to create an inclusive, supportive and collegial research culture.” (Gluck, 2016, p.6).

Academic results can become even better if students enter university with at least modest previous research experience. In this context, creating the curricula that force the research and scientific thinking should start at the secondary school. Curricula and methods of assessment should incorporate research and scientific skills and give the pupils opportunity to practice research skills and develop scientific thinking through the curricular and extra-curricular activities.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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Challenges of Blended versus Online Learning with Arduino for Teachers and Students

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Abstract: The paper provides a comparative analysis of blended learning versus fully online learning of informatics course using Arduino. The aim of the research is to find out which teaching method leaves students more satisfied in learning the basics of electronics and programming. Until the Covid-19 pandemic, teaching took place in a computer classroom, with project-based learning in teams, while all teaching materials were uploaded to Moodle e-course. The advantages of blended learning on Arduino projects are active learning by doing, student collaboration and peer learning, the physical presence of the teacher with his immediate feedback and support. The disadvantages are the limited time to complete the Arduino projects, the need for a sufficient number of Arduino kits, the possibility of hardware failure, and the uneven contributions of student team members. Due to the transition to fully online teaching during the Covid-19 pandemic, the Autodesk Tinkercad Circuits web-based software was chosen. This software provides a virtual Arduino simulator for creating, programming and testing Arduino circuits, and managing a virtual classroom. The advantages of online learning with Arduino are increased effort and motivation of individual students, avoidance of electronic component failures and reduced frustration due to errors. The disadvantages are technical problems, communication problems, such as the lack of direct contact with the teacher and each other, and the lack of development of practical skills. Nevertheless, the research of two generations of first-year students of informatics (N=72) shows that they are more satisfied with online learning on Arduino projects than with blended learning, and this difference is statistically significant ($t(70)=3.91$; $p<0.01$). Therefore, Tinkercad Circuits can be used as an educational tool in regular classes to make learning the basics of electronics and programming more interesting and successful.

Keywords: Online learning, Arduino, Tinkercad, Virtual classroom, Learning satisfaction

Introduction

Although digital learning tools and platforms have been around for decades, they have become an indispensable part of education after the Covid-19 pandemic. The major challenge of using e-learning for teachers is the need to design lessons that make the most of technology and the e-space and actively engage students in learning. Nowadays, it is not enough to use presentation tools and a learning management system (LMS) to complement traditional teaching. To achieve the best results in online learning, it is necessary to reorganise the teaching process and use different pedagogical approaches. Therefore, teachers may need technological, pedagogical and organisational support as well as additional time to develop teaching materials and deliver the lessons (Elshami et al., 2021). E-learning brings a shift from traditional teaching methods by supporting multiple interactions between students, teachers, and learning content through technology. No less important are communication tools and communities that allow students to discuss and share their questions, thoughts, ideas, and results with each other and with the teacher. Fully online learning enables flexible and mobile learning for students, ensures the availability of content 24/7, allows students to track their own progress, and offers personalised learning. At the same time, online learning has some disadvantages. Students may struggle due to reduced social contact, lack of digital skills, lack of self-discipline and loss of motivation, or problems with technology and Internet access. Teachers are often concerned about student identification and cheating on online tests (Newton, 2020). Some studies show that the percentage of students who admitted to cheating in face-to-face and online courses is

almost the same (32%), although many students believe (74%) that it is easier to cheat in online courses (Online Education). Therefore, hybrid or blended learning where a teacher combines face-to-face and online teaching is a good way to get the best out of both approaches.

Arduino in Education

The Arduino platform with a programmable microcontroller is the leading "do-it-yourself" (DIY) tool used in STEM education, enabling students to develop computational thinking and learn programming principles as well as important engineering and science concepts (https://www.arduino.cc/education/). There are numerous examples of the use of Arduino as a learning tool at different levels of education (Ling & Wah, 2019; Karaahmetoglu & Korkmaz, 2019; Roumen & Fernaeus, 2021; Kim & Lee, 2017). Arduino is affordable, open source, easy to use, and easy to assemble without soldering components. It can be coded and a variety of sensors give it the ability to collect and process real world data, and take appropriate action. There are many resources for teaching and learning with Arduino, including lessons preparations, articles and manuals, libraries of ready-made projects with schematics, programming code and explained building steps. Arduino lessons allow students to link knowledge from different fields (especially STEM), apply it to real problems and better understand the interactions of programme code with real hardware. (Kim & Lee, 2017).

Informatics and computer science education should be active, focused on creative thinking and problem solving, keeping in mind bridging the gap between the classroom and the demands of the labour market. It is not uncommon for people who succeed in school and university to experience difficulties and failures when faced with real-life problems (Bahadir, 2020). By using Arduino in class, students learn how to connect electronic components to an Arduino board, program a microcontroller, test and debug it until they create a functional system that interacts with its environment. In this way, students acquire applicable knowledge, develop critical thinking and problem-solving skills, as well as time and stress management skills (Krelja Kurelovic et al., 2020). Such courses, whether blended or online, provide students with an engaging learning experience. Arduino in education helps students acquire skills that will play an important role in future jobs driven by robotics, the Internet of Things, machine learning, artificial intelligence, and other emerging technologies (Krelja Kurelovic, 2022).

Methodology

Teaching Methods

In the 1st year of introductory informatics course, the Arduino platform was used for 15 hours of laboratory lessons. As all teaching materials and other resources were carefully selected, prepared and uploaded to the Moodle e-course, while the students' practical activities took place in the computer lab, it was a blended learning course. During the lab lessons, students used Arduino RFID kits to apply theoretical knowledge in practice. Using project-based learning, learning by doing, and peer learning methods, they built 5 interactive systems with Arduino, from simple to complex. They learned how to use different sensors to collect input data from the environment, process this data and perform an action. Each student had their own role in the team (connecting components, writing code, documenting, describing, and presenting the project using a systems approach), and with each new project, the roles changed (Krelja Kurelovic et al., 2020). This gave the students the opportunity to participate in each team role, collaborate, share knowledge, solve problems, and take responsibility for the overall success of the project.

The challenges for the teacher in such teaching are numerous. It is necessary to properly design and prepare all the learning materials, install the necessary software on the computers (Arduino IDE editor), provide enough Arduino kits for the students, regularly check the correctness of the components and the Arduino board (hardware damage is not uncommon), motivate the students to find a solution when an Arduino project does not work, manage the schedule, and remind the students of deadlines.

During the Covid-19 pandemic, all teaching took place online. In addition to the Moodle e-course where all learning resources were stored and communication took place, the Autodesk Tinkercad web-based software was chosen for the laboratory lessons, which were conducted in real time via webinar. Autodesk Tinkercad has a friendly user interface and provides a good user experience. Tinkercad Classroom (Figure 1) enables the creation of virtual classes where students use Tinkercad tools for 3D design, electronics, and coding, and teachers monitor students' progress and guide them (https://www.tinkercad.com/). Tinkercad Circuits was used

to create Arduino projects. It is an intuitive, user friendly, interactive circuit web editor where students can explore, connect and code using the Arduino board, electronic components (LEDs, resistors, capacitors, etc.), sensors or actuators on the component panel. Arduino circuits in Tinkercad can be coded using the Blocks code editor or with C++ in a text-based editor (Figure 2) which is similar to the Arduino IDE editor.

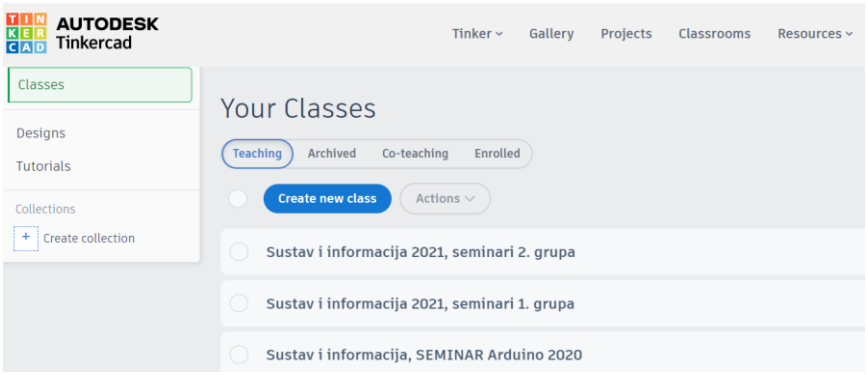

Figure 1. Tinkercad classes dashboard

Guided by the teacher's demonstration via video conferencing, students had to virtually assemble an Arduino system in Tinkercad and write a program that the microcontroller would execute. After coding, they had to test if the created system works, so the simulation runs in Tinkercad Circuits (Figure 2). Debugging is the most challenging step where a student improves their problem-solving skills, and Tinkercad's error console helps by reporting and flagging lines of code that need to be corrected. The teacher randomly asked the students to share the screen and show how their Arduino project works. It was a time for discussion and additional information, if needed. After the online class ended, the teacher checked the progress on each student's Arduino project in Tinkercad Classes and gave them feedback, which took a lot of the teacher's time.

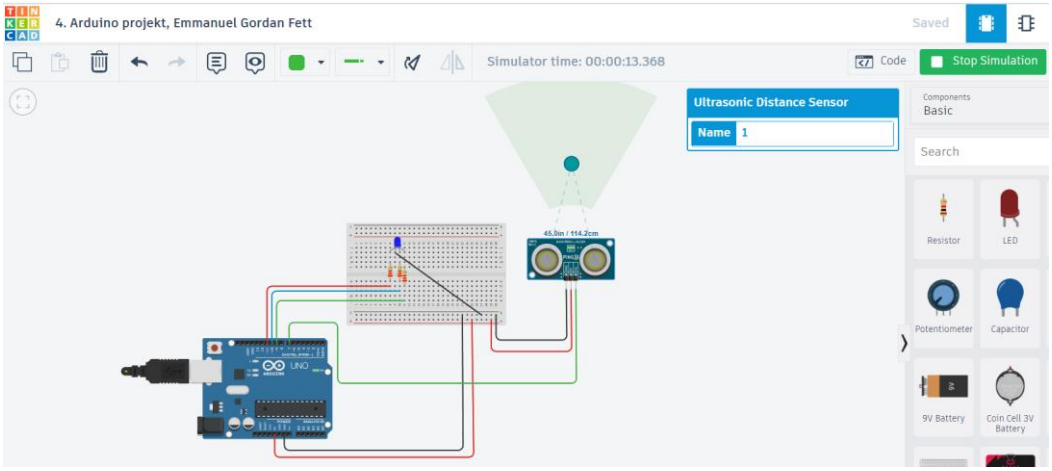

Figure 2. Simulation of Arduino project "distance sensor"

Compared to blended learning, in the fully online classes, each student worked individually on each Arduino project and had the opportunity to continue working on the project after the class ended. They had limited opportunities to collaborate and learn amongst peers, but were more engaged and involved. All communication and feedback from the teacher took place virtually using asynchronous communication tools.

Research Methods

The aim of the research is to determine whether students are more satisfied with blended learning or fully online learning during computer labs with Arduino. This is important for the teacher to improve their teaching and increase the student satisfaction with learning. Accordingly, the following null hypothesis is proposed:

H0: There is no significant difference in student satisfaction with blended learning or fully online learning using Arduino.

For the research, 1st year informatics students were surveyed over two years (2019–2020). At the end of the semester, students filled out a specially designed online questionnaire available on the Moodle e-course. Participation in the survey was anonymous and voluntary. To create the questionnaire on satisfaction with teaching and learning, similar studies were used and adapted to the needs of this research (Bahadir, 2020; Torrado & Blanca, 2022; Ling & Wah, 2019; Martin & Bolliger, 2022; Elshami et al., 2021). The questionnaire contained a demographic question (gender) and 8 statements on satisfaction with teaching and learning with Arduino. Students were asked to indicate the level of agreement with these 8 statements on a Likert-type scale (5=strongly agree, 1=strongly disagree). The last question was open-ended and optional, in which students could write what they liked or disliked about the Arduino lessons.

Results and Discussion

The research sample consists of 72 students. In 2019, there were 42 respondents with whom classes were conducted on-site, and using blended learning. A year later, there were 30 respondents with whom the teaching took place completely online. According to the population of students in informatics, where are more men than women, the sample includes 79% male and 31% female students.

The descriptive statistics of the questions on satisfaction with learning with Arduino are shown in Table 1. Students were mostly satisfied with Arduino lessons, although those in online classes expressed greater satisfaction. The fact is that there were not Arduino kits available in the on-site computer labs, 90 minutes was sometimes not enough to complete the tasks, and physical failures due to improper use of the electronic components were also not uncommon. The virtual simulator Tinkercad Circuits which was used in online classes solves most of the problems mentioned. Both groups of students are almost equally satisfied with the learning resources that were available in the Moodle e-course and with the feedback from the teacher. In the online learning, the teacher supported the students remotely in real time and gave them written feedback after class if needed.

Table 1. Descriptive statistics of responses to the questionnaire

Statements	Blended learning (N=42)	Online learning (N=30)
	Mean	*Mean*
1. I am satisfied with the organization and performance of the teaching the lab lessons with Arduino.	3.79	4.14
2. Learning resources and teacher feedback were available and useful for following lessons and completing assignments.	4.0	4.32
3. I am satisfied with my own progress in making Arduino projects.	3.48	4.29
4. I was able to solve hardware or software issues if they occurred.	2.93	3.92
5. Learning with Arduino was an interesting experience for me.	3.57	4.36
6. Lessons were of appropriate difficulty and I was able to follow them.	3.38	4.07
7. I am satisfied with the competences I have acquired in the lab lessons with Arduino.	3.52	4.25
8. I would recommend other students to participate in lab lessons with Arduino.	3.88	4.42
Total	*3.57*	*4.23*

It seems unexpected that students in online classes were more satisfied with their ability to solve hardware or software problems when they arose, but these students were not faced with a physical Arduino, which caused much frustration for the students. In online classes, each student worked individually on each Arduino project and had the opportunity to personalise their learning and experiment without fear of breaking anything. In blended learning, students worked in teams with a physical Arduino and had limited time to complete their projects, and the contribution of team members was often uneven. Consequently, in online learning students were more satisfied with their learning experience, their personal development and the skills they acquired. Both groups of students agree that they would recommend the lab lessons with Arduino to other students, although the students in the online learning agreed more with this statement.

Using the t-test for two independent samples, the observed differences in student satisfaction with teaching and learning using two different methods were found to be statistically significant. The students who learned completely online (*N=30; M=4.23*) showed significantly higher satisfaction with learning with Arduino compared to those in blended learning (*N=42; M=3.57*), which was confirmed by a t-test, $t(70)=3.91$, $p<0.01$. With a confidence level of 99%, the null hypothesis H0 can be rejected.

Since blended learning combines two approaches, on-site learning and online learning, it is expected that students are more satisfied with it. There are studies that confirm student satisfaction with blended learning. However, some recent studies report high satisfaction with online learning, which offers many advantages to students (Elshami et al., 2021). Online learning is also supported by studies on the use of Arduino in online laboratory activities in undergraduate physics, which show that students were more creative in designing and conducting experiments, discussed topics in more detail and thought more deeply about answers to questions, while grades did not differ from those in traditional learning (Organtini, Tufino, 2022).

Conclusion

The Arduino platform has great potential for use in education and prepares students for the dynamic job market in the IT sector. In both, blended learning and fully online learning with Arduino, students solve project tasks, gain insight into how real systems work and communicate with each other, and understand the applications of what they have learned. In blended learning, students learned a lot from each other by working in teams, sharing tasks and responsibilities, and solving problems through mutual communication, which gave them some new practical and social skills. At the same time, the physical connection of the electronic components to the Arduino board caused many problems for the students, which they faced for the first time, and caused a lot of dissatisfaction. Fully online learning during the period of global lockdown brought some advantages to the students. Learning was location-independent, students felt stress free and they showed more effort, motivation, and creativity. The Arduino simulator in the web-based software Tinkercad Circuits facilitates experiments with the Arduino and improves the overall learning experience for the students. Although the teacher needed more time to prepare the online lessons, give feedback and monitor the students' work, there was no need to check the correctness of the Arduino kits. It seems justified to use the Arduino simulator in on-site teaching to enhance the blended learning experience.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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Artificial Intelligence and Machine Learning in Governmental Artisanal Mining: Current Status, Development, and Future Directions

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Abstract: The COVID-19 pandemic is not an obstacle research and development implementation, one of which uses secondary data and bibliometric methods. Studies on mining regulation are generally about formal mining in the form of corporations, while artisanal mining is considered illegal, criminal, and its operation is prohibited because it inhibits the growth rate of a country's socio-economic development. This study aims to analyse previous studies on governmental artisanal mining published in the Scopus database and data processing using VOSviewer software. The findings show that there are 287 documents on governmental artisanal mining published from 1987 to 2023. United Kingdom, Canada, and United States occupy most countries of publication as the place of author affiliation. Meanwhile, the author who produced the largest number of publications and is cited mostly was Galvin Hilson. The top ten publications based on the number of citations were obtained by the majority of journals ranked in Quartile 1 with the top rankings being Resource Policy Journal, Journal Cleaner Production, and Science of the Total Environment Journal. The dominant keywords used by authors were "artisanal and small-scale mining", "formalization", "illegal mining", "Ghana", and "gold". The data revealed that there are still limited studies discussing the link between the governmentality of artisanal mining and local politics, other mining, and identity, as well as its relationship with the COVID-19 pandemic. Future studies can further develop the case of governmental artisanal mining from a social critical perspective and in comparison with other types of mining across countries.

Keywords: Bibliometrics, Knowledge mapping, Text mining, VOSviewer

Introduction

Artisanal or illegal mining tends to be one of the focuses of rural community livelihoods. Even though it is prohibited by the government because its activities are without permits and are not standardized, subsistence living conditions and inability of supporting their households due to poverty conditions require them to diversify their income and to switch to non-agricultural economy, especially artisanal mining (Eng, 2014; Hilson, 2012; Hilson, 2009, 2016; Manolache & Viorica Bedrule-Grigoruģă, 2014), in Africa, India and Indonesia.

Community mining is small-scale mining managed by local communities without permits using simple technology (Hilson & Mcquilken, 2014). This was viewed negatively by the general public, triggering criticism against these activities (Hilson, 2016). For example, mining is closely related to poverty, has negative impacts on environment and health, causes social conflict, and does not support development programs. However, this sector absorbs a lot of labour, generates large incomes for the poor, and is linked to subsistence agriculture in rural areas (Buxton, 2013; Maconachie & Hilson, 2016).

Governmental and artisanal mining have an important relationship. How have previous studies reviewed it? This bibliometric study is useful in bridging and displaying links with previous studies on a macro level. Bibliometrics studies on this issue are limited. Morante-Carballo et al. (2022) conducted a bibliometric analysis

of artisanal and small-scale mining but did not consider their relevance to these mining settings. Although there have been bibliometric studies using VOSviewer (Cancino et al., 2017; Chandra et al., 2016; Sun & Yuan, 2020), these studies do not cover this topic and most of the sources come from the Web of Science (Aleixandre-Tudó et al., 2018; Cancino et al., 2017; Popova et al., 2013; Sun & Yuan, 2020). This is perhaps the first study to use bibliometric methodology and VOSviewer to examine governmentality and artisanal mining. This article can be a reference for researchers, policymakers, or science practitioners in making decisions and planning future research or establishing networking with related authors. This paper highlights the novelty of recent developments in the field of governmentality and artisanal mining as well as opportunities for further research, as well as a bibliometric analysis of Scopus-indexed articles by integrating visualization analysis from VOSviewer software.

Conducting field studies on artisanal mining, though, has its own challenges. For example, the COVID-19 pandemic having hit almost all parts of the world has made difficult the implmentation of research activities as well as mining activities themselves. However, through the development of technology, we are now able to obtain data as well as process it in a short time with accurate results. Artificial intelligence (AI) has now become a necessity, even part of the daily routine penetrating every aspect of life. AI has an ability of automizing the repetition of tasks and predicting the results. This certainly improves the humans' ability of making decisions.

AI is a broad term to describe computer intelligence with the ability of performing tasks in a human-like manner, including the process of reasoning, meaning, generalization, as well as learning from experience. On the other hand, Machine Learning (ML) is a further development, an aspect, or a branch of AI. If AI is a concept showing a direction to go, ML is an effort to define it more specifically. Through ML, data can be easily identified and if is trained correctly, it will be possible to make predictions in the future because its algorithmic capabilities allow it to produce more accurate information, (Goksel & Bozkurt, 2019).

Artificial intelligence and machine learning help manage, process, and evolve data. For this reason, these mechanisms are important in supporting the alignment of knowledge needs and development, especially improving skills learning and collaborative learning in higher education institutions (Kuleto et al., 2021). In this governmental artisanal mining study, AI & ML is important in reviewing documents more effectively and efficiently, thus supporting the achievement of better quality in literature mapping and subsequent predictions on this issue. Through this system, it is possible for researchers and academics to calibrate knowledge development in improving the overall experience and quality of their studies, both in individual and institutional contexts (Chen et al., 2020).

This research aims to analyse general trends in governmentality artisanal mining in the Scopus database. The Scopus database still tends to be a dominant and trusted reference because it has a high impact factor. A scientific journal has a performance metric or indexing in identifying the number of citations as an indicator of the quality of a paper. So, the questions to be answered are:

1. How do the governmental artisanal mining publications develop across the Scopus database?
2. Who are the influential authors and in what countries are these publications?
3. What are the main reference documents?
4. What are the dominant topics reviewed by the authors?
5. What are the topic gaps or opportunities for further study?

Method

This research uses a bibliometric approach as part of the quantitative research method (van Eck & Waltman, 2014; Waltman & Noyons, 2018). This study is useful as an evaluation research in describing the quality of publications through statistical indicators of citations (Onsunkentan, 2021; Padrós-Cuxart et al., 2016). This type of research is very useful for research and development in finding research gaps, as well as decision and policy making (Nandiyanto et al., 2020).

At this stage, the research team searched for some documents on February 2, 2023, throughout the Scopus database. Researchers searched for the title, abstract, and keywords with the keywords "government" or "governmentality" and "artisanal mining" or "small mining" or "illegal mining". We limited the search to English-only publications. This resulted in 287 documents for further analysis in this study.

Once the data was obtained, the next process was to analyse the literature using VOSviewer 1.6.16 software. The large amount of data allowing for the presentation with an attractive display through visualization of bibliometric network analysis, such as the "Visualization of Similarity" (VOS) technique (van Eck & Waltman, 2014). An attractive display makes the correlation visible and the message conveyed, thus understandable and memorable to the readers (Ranjbar-Sahraei & Negenborn, 2017).

Result and Discussion

Publication Trends

The results of the literature search in the Scopus database with the theme "Government Artisanal Mining" have received enough attention since 1987 until now. Based on primary data, a total of 287 documents on Government Artisanal Mining were found. The first document is a scientific article published in 1987 entitled "Empresa Nacıonal De Mınerıa – Chıle" by Crozier (1987) published by "Mining Magazine" Volume 157, Issue 4, October 1987. Meanwhile, a significant increase in publications was found in 2008 with 34 documents, then increased to 38 documents (2019), and 40 documents (2022) (See **Figure 1.**). This provides a greater opportunity for the discourse on Governmental Artisanal Mining to remain to be a trend in the future.

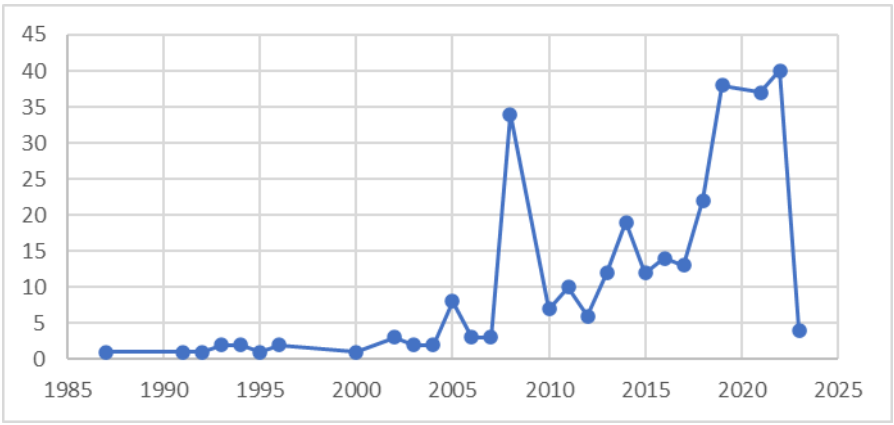


Figure 1. Trend publication

Most of 228 (80%) Governmental Artisanal Mining publications are made article format , 17 (5.96%) in book chapter, 16 (5.61%) in review, 15 (5.26%) in conference paper, 6 (2.10%) in note, 2 (0.70%) in letter and 1 (0.35%) in book format.

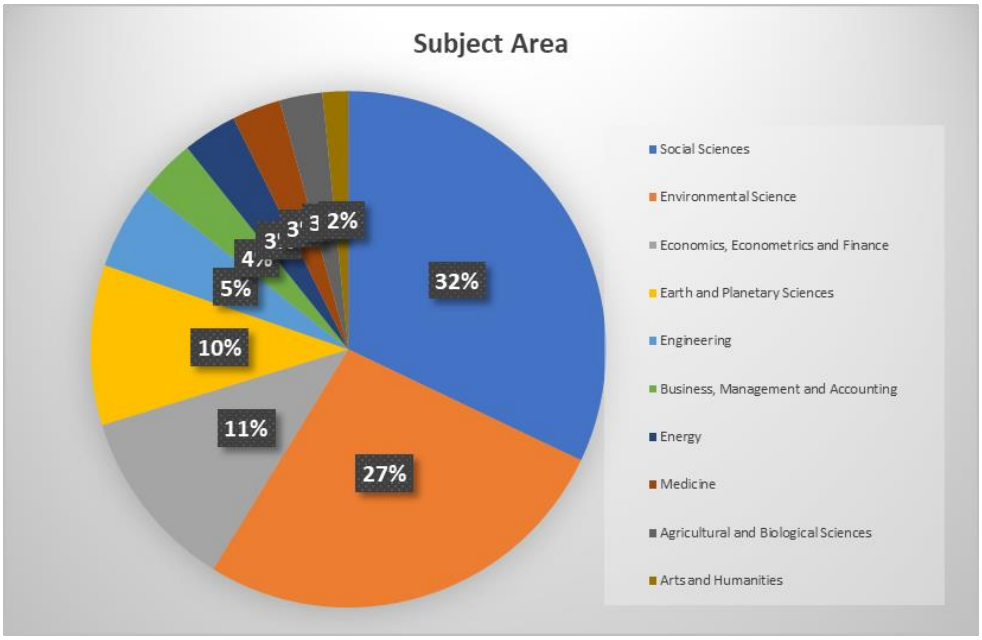
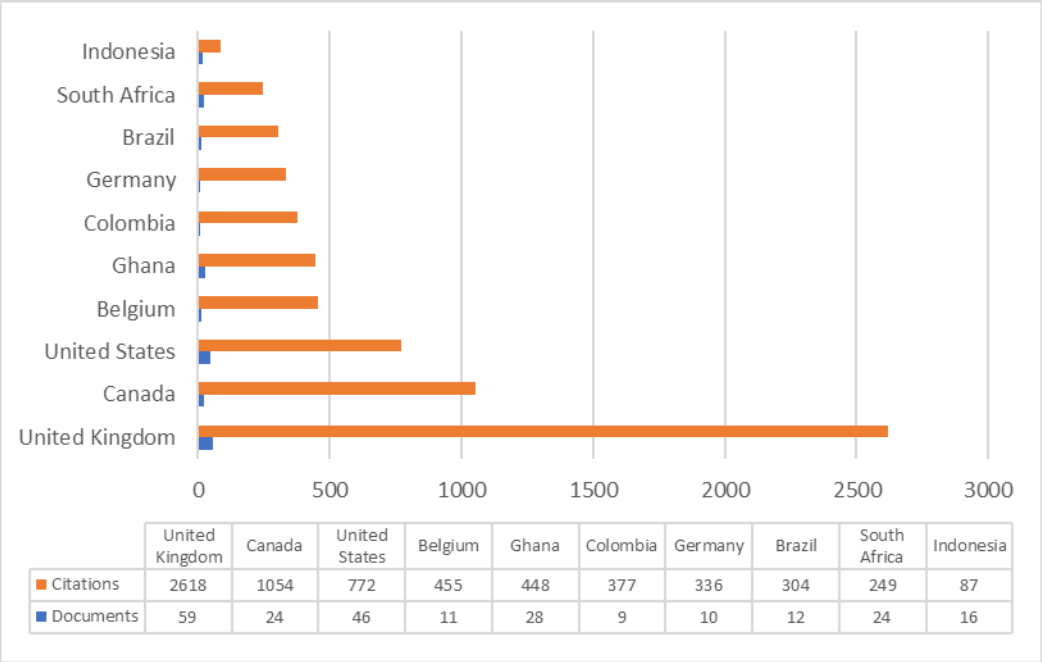


Figure 2. Subject area

There are 21 research subject areas of Governmental Artisanal Mining. Ten (10) subject areas dominate the writing: (1) Social Sciences 179 (32%), (2) Environmental Science 149 (27%), (3) Economics, Econometrics and Finance 64 (11%), (4) Earth and Planetary Sciences 56 (10%), (5) Engineering 30 (5%), (6) Business, Management and Accounting 20 (4%), (7) Energy 19 (3%), (8) Medicine 17 (3%), (9) Agricultural and Biological Sciences 15 (3%), and (10) Arts and Humanities 9 (2%) (see Figure 2.).

Country

An analysis was also conducted based on the author's country of origin. It is known that there are 64 countries of origin of authors with this theme. The data presented in Figure 3 are the top 10 (ten) countries with the highest number of documents and citations. In terms of the author's country of origin (1) the United Kingdom is the country with the highest number of articles and citations resulting in 59 documents and 2,618 citations, followed by (2) Canada with 24 documents and 1,054 citations, followed by (3) United States with 46 documents and 772 citations, (4) Belgium with 11 documents and 455 citations, and (5) Ghana with 28 documents and 448 citations. Germany ranked 7th with 10 documents and 336 citations, and Indonesia ranked 10th with 16 documents and 87 citations.



	United Kingdom	Canada	United States	Belgium	Ghana	Colombia	Germany	Brazil	South Africa	Indonesia
Citations	2618	1054	772	455	448	377	336	304	249	87
Documents	59	24	46	11	28	9	10	12	24	16

Figure 3. Author's contributions based on countries

The results of bibliometric analysis based on network visualization in Figure 4 show that there are 7 clusters and 32 countries of the Governmental Artisanal Mining constituent network with at least 1 document and 15 citations for a country. Cluster 1 (red) shows a network of authors from 6 countries: Australia, Canada, Colombia, Ecuador, Mexico, and the United States. Cluster 2 (green) shows the network of authors from 6 countries: Austria, Denmark, Germany, Netherlands, Sweden, and Tanzania. Cluster 3 (blue) shows the network of authors from 5 countries: Malaysia, Nigeria, Pakistan, South Africa, and Zimbabwe. Cluster 4 (yellow) shows the network of authors from 5 countries: Belgium, Brazil, Indonesia, Japan, and Mozambique. Cluster 5 (purple) shows the network of authors from 4 countries: France, Kenya, Portugal, and Switzerland. Cluster 6 (light blue) shows the network of authors from 2 countries: Egypt and Ghana and finally Cluster 7 (Orange) shows the network of authors from 2 countries: Sierra Leone, and the United Kingdom. Based on Fıgure 4 It can be seen that the United Kingdom, the United States, and Canada are the countries with the most publication contributions as seen from the largest nodes. These three countries are also connected to many authors from the network across all clusters.

Out of 547 institutions from which the authors come in the theme of Governmental Artisanal Mining, the 10 (ten) institutions receiving the most citations from published documents are presented in Table 1. We limit the data processing to the least number of documents an organization has (2) and the least number of citations an organization has (25). The findings show that the University of British Columbia is the institution publishing the most (5) documents (TP), while the institutions getting the most citations for published articles are UCSIR-

National Metallurgical and Korea Institute of Geoscience and Mineral Resources with 396 citations each. Of the 10 (ten) institutions publishing the most publications, UCSIR-National Metallurgical and Korea Institute of Geoscience and Mineral Resources are institutions publishing publications with the highest quality documents of 198 (TC/TP). This means that every 1 document is cited 198 times.

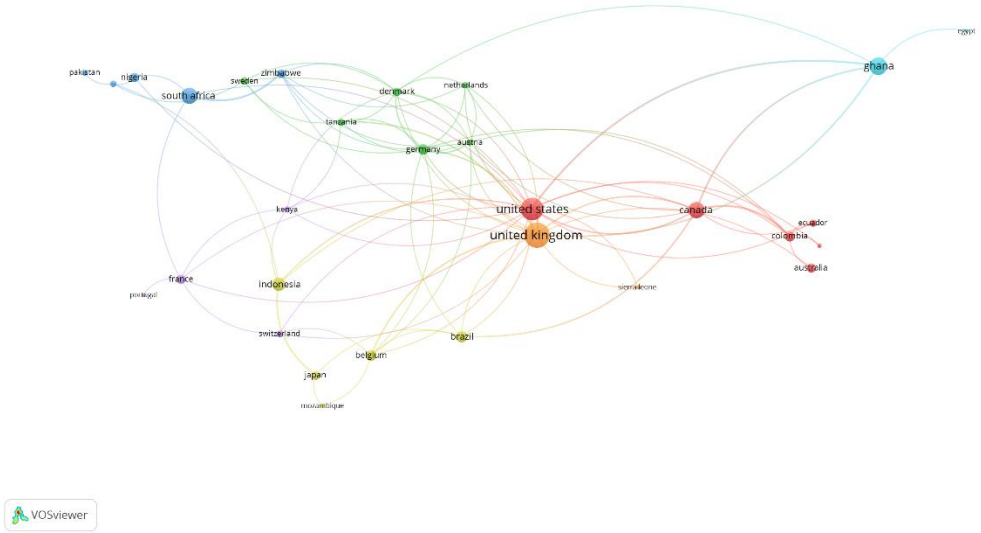


Figure 4. Author network based on state affiliation

Table 1. Top 10 author affiliation institutions

Rank	Institution	TC	TP	TC/TP
1st	UCSIR – National Metallurgical Laboratory	396	2	198
2nd	Korea Institute of Geoscience and Mineral Resources	396	2	198
3rd	University of London	249	2	124.5
4th	University of Surrey	237	4	59.25
5th	University of British Columbia	204	2	102
6th	University of British Columbia	201	5	40.2
7th	University of Surrey	142	2	71
8th	University of Bath	58	2	29
9th	University of the Witwatersrand	55	2	27.5
10th	University of Surrey	36	2	18

TC: Total Citation
TP: Total publication

Prolific Author

The findings show that 656 authors collaborated to write on the theme of Governmental Artisanal Mining from 1987 to 2023. From Table 2**,** we can see the top 10 (ten) dominant authors by the number of citations.

Table 2. Top 10 authors researching "Governmental Artisanal Mining"

Rank	Author Name	Institutions	Number of Paper	Number of Citations	Quality of Paper
1st	Gavin Hilson	University of Surrey, UK	25	1632	65.28
2nd	Abby Hilson	Royal Holloway University, UK	4	316	79
3rd	James Mcquilken	University of Surrey, UK	4	218	54.5
4th	Roy Maconachie	University of Bath, UK	7	330	47.17
5th	Steven Van Bockstael	University of Ghent, Belgium	4	166	41.5
6th	Sadia Mohammed Banchirigah	University of Manchester, UK	3	418	139.3
7th	Peter Cordy	Yale University	3	267	89
8th	Marcello M. Veiga	University of British Columbia, Canada	11	820	74.54
9th	Sara Geenen	University of Antwerp, Belgium	4	235	58.75
10th	Samuel J. Spiegel	University of Edinburgh, UK	6	163	27.16

The author who published the most documents (Number of Papers) and received the most citations (Number of Citations) was Gavin Hilson (University of Surrey Business School) with 25 documents and 1,632 citations. The author with the best paper quality (Quality of Paper) is Sadia Mohammed Banchirigah (University of Manchester, Manchester, UK). For more details on the number of publications, the number of citations, and the quality of publications each author has can be seen in Table 2 below.

Source of Publications

From 1987 to 2022, 152 publication sources published publications related to this theme. Of the 152 publication sources, 10 publication sources publish the most documents related to the theme of Governmental Artisanal Mining (see Table 3.). The ten publication sources are on average still indexed by Scopus in 2021 so that CiteScore, SNIP, and SJR can still be accessed in each publication source.

The Resources Policy journal is the publication source contributing mostly to publishing Governmental Artisanal Mining writings as well as getting most citations from the published documents, 39 papers and 1,027 citations. For more details, the Top 10 publication sources can be seen in Table 3 below.

Table 3. Top 10 sources of publication

Rank	Source Title	Q		Cite Score (2021)	SNIP (2021)	SJR (2021)	Number of Papers	Number of Citations
1st	Resources Policy	Q1	United Kingdom	7.6	1.996	1.461	39	1027
2nd	Journal of Cleaner Production	Q1	United Kingdom	15.8	2.444	1.921	5	545
3rd	Science of the Total Environment	Q1	Netherlands	14.1	2.175	1.806	4	425
4th	Natural Resources Forum	Q2	United Kingdom	3.8	1.009	0.686	10	407
5th	Hydrometallurgy	Q1	Netherlands	7.3	1.363	0.799	2	396
6th	Geoforum	Q1	United Kingdom	5.9	1.737	1.424	8	376
7th	Extractive Industries an Society	Q1	Netherlands	5.2	1.463	0.971	18	350
8th	Development and Change	Q1	United Kingdom	5.4	2.362	1.607	3	334
9th	Resources	Q2	Switzerland	6.4	1.429	0.742	1	312
10th	Political Geography	Q1	United Kingdom	4.9	2.092	1.369	1	193

Citation

Also, the results of data processing can show bibliographic coupling in this Governmental Artisanal Mining publication based on the document. Bibliographic coupling is useful in seeing the relationship between the documents. The results from the following 12 clusters are presented in Figure 4.

Cluster 1 (red) consists of:

1. Clean artisanal gold mining: a utopian approach? (Hinton et al., 2003)
2. Mercury contamination from artisanal gold mining in Antioquia, Colombia: The world's highest per capita mercury pollution (Cordy et al., 2011)
3. Abandoned artisanal gold mines in the Brazilian Amazon: A legacy of mercury pollution (Veiga & Hinton, 2002)
4. Review of barriers to reduce mercury use in artisanal gold mining (Veiga et al., 2014)

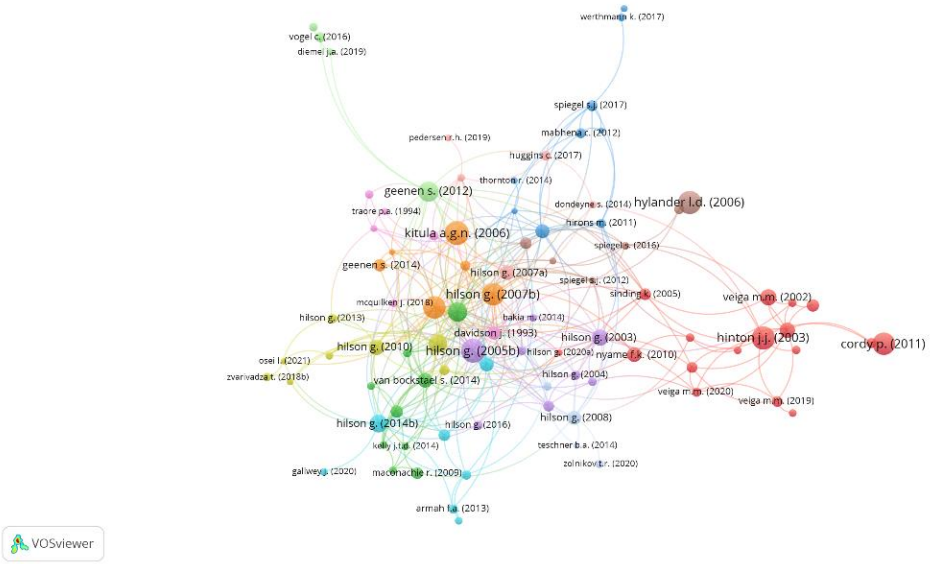


Figure 5. Document by citation

Cluster 2 (green) consists of:

1. Deagrarianization, reagrarianization and local economic development: Reorientating livelihoods in African artisanal mining communities (Banchirigah & Hilson, 2010)
2. The persistence of informality: Perspectives on the future of artisanal mining in Liberia (Bockstael, 2014)
3. Artisanal and small-scale mining and the Sustainable Development Goals: Opportunities and new directions for sub-Saharan Africa (Gavin Hilson & Maconachie, 2020)

Cluster 3 (blue) consists of:

1. Shifting Formalization Policies and Recentralizing Power: The Case of Zimbabwe's Artisanal Gold Mining Sector (S. J. Spiegel, 2015b)
2. EIAs, power and political ecology: Situating resource struggles and the techno-politics of small-scale mining (S. J. Spiegel, 2017)
3. Mining with a 'Vuvuzela': reconfiguring artisanal mining in Southern Zimbabwe and its implications to rural livelihoods (Mabhena, 2012).

Cluster 4 (yellow) consists of:

1. Artisanal and small-scale mining (ASM) in sub-Saharan Africa: Re-conceptualizing formalization and 'illegal' activity (Gavin Hilson et al., 2017)
2. Child Labour in African Artisanal Mining Communities: Experiences from Northern Ghana (Gavin Hilson, 2010)
3. Digging for Survival and/or Justice? The Drivers of Illegal Mining Activities in Western Ghana (Andrews, 2015)

Cluster 5 (purple) consists of:

1. Structural Adjustment and Subsistence Industry: Artisanal Gold Mining in Ghana (Gavin Hilson & Potter, 2005)
2. Why Is Illegal Gold Mining Activity so Ubiquitous in Rural Ghana? (Gavin Hilson & Potter, 2003)
3. Small–scale mining in South Africa: Past, present and future (Mutemeri & Petersen, 2002)

Cluster 6 (light blue) consists of:

1. Chinese participation in Ghana's informal gold mining economy: Drivers, implications and clarifications (Gavin Hilson et al., 2014)

2. Soon there will be no one left to take the corpses to the morgue: Accumulation and abjection in Ghana's mining communities (Bush, 2009)
3. Conflict, collusion and corruption in small-scale gold mining: Chinese miners and the state in Ghana (Crawford & Botchwey, 2017)

Cluster 7 (orange) consists of:

1. The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita District (Kitula, 2006)
2. Strained relations: A critical analysis of the mining conflict in Prestea, Ghana (Gavin Hilson & Yakovleva, 2007)
3. Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots (Banchirigah, 2008)
4. Dispossession, displacement and resistance: Artisanal miners in a gold concession in South-Kivu, Democratic Republic of Congo (Geenen, 2014)

Cluster 8 (brown) consists of:

1. Environmental costs of mercury pollution (Hylander & Goodsite, 2006)
2. Large and artisanal scale mine development: The case for autonomous co-existence (Gavin Hilson et al., 2020)
3. Implications of the Minamata Convention on Mercury to informal gold mining in Sub-Saharan Africa: from global policy debates to grassroots implementation? (S. Spiegel et al., 2015)

Cluster 9 (pink) consists of:

1. The transformation and successful development of small-scale mining enterprises in developing countries (Davidson, 1993)
2. Formalizing artisanal mining 'spaces' in rural sub-Saharan Africa: The case of Niger (Gavin Hilson et al., 2019)

Cluster 10 (dark orange) consists of:

1. To move or not to move: Reflections on the resettlement of artisanal miners in the Western Region of Ghana (Gavin Hilson et al., 2007)
2. A 'cartography of concern': Place-making practices and gender in the artisanal mining sector in Africa (Huggins et al., 2017)

Cluster 11 (light green) consists of:

1. A dangerous bet: The challenges of formalizing artisanal mining in the Democratic Republic of Congo (Geenen, 2012)
2. Terr(it)or(ies) of Peace? The Congolese Mining Frontier and the Fight Against "Conflict Minerals" (Vogel & Raeymaekers, 2016)

Cluster 12 (sky blue) consists of:

1. Fair trade gold: Antecedents, prospects and challenges (Gavin Hilson, 2008)
2. Effects of the government's ban in Ghana on women in artisanal and small-scale gold mining (Zolnikov, 2020)

The 285 Governmental Artisanal Mining documents were found to contribute to 6,752 citations. This finding shows that on average, one document contributes to 23.69 citations (equivalent to 24 citations). The publications receiving the most citations were in Article and Review formats (see Table 4**.**).

First, publications mostly cited in article format consisted of three articles: (1) "The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita District" by Kitula in 2006 (Kitula, 2006), published in the Journal of Cleaner Production with 223 citations and an annual average citation of 13.11; (2) "Structural Adjustment and Subsistence Industry: Artisanal Gold Mining in Ghana" by Hilson & Potter in 2005 (Gavin Hilson & Potter, 2005), published by Development and Change, with 217 citations and an

average annual citation of 12.05; (3) "Clean artisanal gold mining: a utopian approach?" by Hinton et al 2003 (Hinton et al., 2003), published by the Journal of Cleaner Production, with 207 citations and an average annual citation of 10.35.

Table 4. Top 10 publications

Rank	Title	Year	Source Title	Document Type	Total Citations	TC/Y
1st	Review on hydrometallurgical recovery of rare earth metals (Jha et al., 2016)	2016	Hydrometallurgy	Review	344	49,14
2nd	Rare earth elements: Overview of mining, mineralogy, uses, sustainability and environmental impact (Haque et al., 2014)	2014	Resources	Review	312	34,66
3rd	The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita District (Kitula, 2006)	2006	Journal of Cleaner Production	Article	223	13,11
4th	Structural Adjustment and Subsistence Industry: Artisanal Gold Mining in Ghana (Gavin Hilson & Potter, 2005)	2005	Development and Change	Article	217	12,05
5th	Clean artisanal gold mining: a utopian approach? (Hinton et al., 2003)	2003	Journal of Cleaner Production	Review	207	10,35
6th	Environmental costs of mercury pollution (Hylander & Goodsite, 2006)	2006	Science of The Total Environment	Article	201	11,82
7th	Strained relations: A critical analysis of the mining conflict in Prestea, Ghana (Gavin Hilson & Yakovleva, 2007)	2007	Political Geography	Article	193	12,06
8th	Mercury contamination from artisanal gold mining in Antioquia, Colombia: The world's highest per capita mercury pollution (Cordy et al., 2011)	2011	Science of The Total Environment	Article	190	15,83
9th	Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots (Banchirigah, 2008)	2008	Resources Policy	Article	186	12,4
10th	A dangerous bet: The challenges of formalizing artisanal mining in the Democratic Republic of Congo (Geenen, 2012)	2012	Resources Policy	Article	153	13,90

Second, publications mostly cited in Review format are (1) "Review on hydrometallurgical recovery of rare earth metals" by Jha et al in 2016 (Jha et al., 2016), published by Hydrometallurgy with 344 citations and an average annual citation of 49.14; (2) "Rare earth elements: Overview of mining, mineralogy, uses, sustainability and environmental impact" by Ahaque et al., 2014 (Haque et al., 2014) published by Resources with 312 citations and an average annual citation of 34.66.

Keyword Analysis

Further data processing is conducted by showing the author's keywords map. The findings show that there are 774 author keywords obtained from the Governmental Artisanal Mining document, but only the top 132 keywords were taken for analysis, indicating 12 clusters (see Figure 6.).

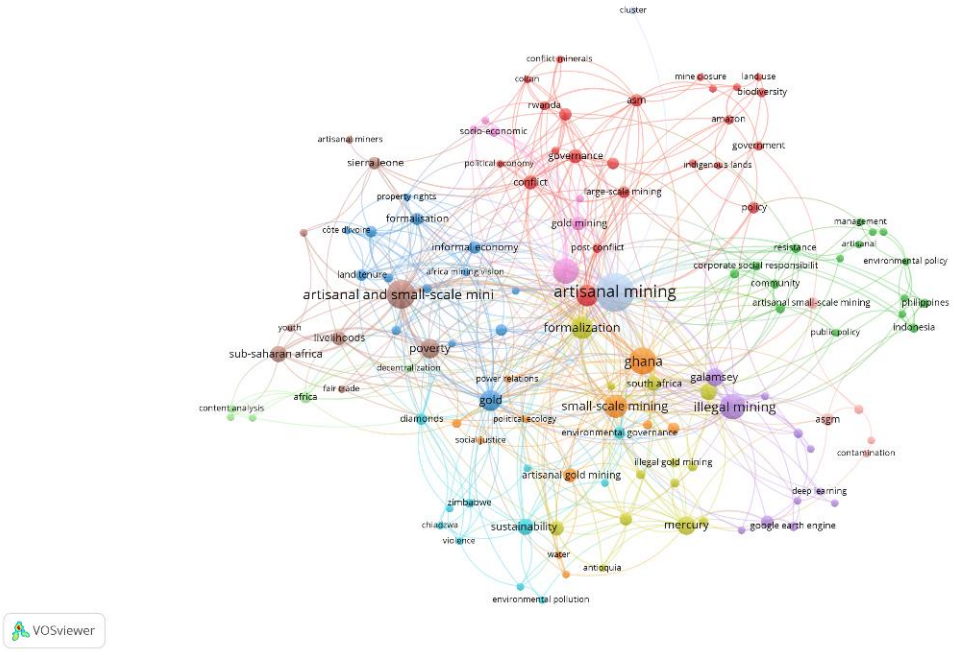


Figure 6. Author keywords

Cluster 1 (red) is characterized by 23 nodes dominated by 7 topics. These topics include mining, conflict, governance, large-scale mining, democratic Republic of Congo, ASM, and policy. Then, these are followed by some other topics: amazon, biodiversity, coltan, communities, conflict minerals, democratic Republic of the Congo, government, indigenous lands, indigenous peoples, land use, *madre de dios*, mine closure, natural resources, political economy, post-conflict, and Rwanda. In cluster 2 (green), there are 16 nodes. Topics in this cluster are dominated by the themes of community, Indonesia, Philippines and corporate social responsibility. Other topics are artisanal, China, development, environmental impact, environmental policy, management, public policy, regulation, resistance, sand mining, small-scale mining, and women. Cluster 3 (blue) is characterized by 14 nodes dominated by 5 topics: gold, informal economy, informality, land tenure, and extractive industries. Other topics are Africa mining, vision, *Burkina Faso*, economic development, formalization, legal pluralism, Liberia, natural resource governance, and property rights. Cluster 4 (yellow) is characterized by 13 nodes. The dominating topics are formalization, mercury, sustainable development, South Africa, and Colombia. In addition, there are also other topics such as abandoned mines, antioquia, artisanal and small-scale gold mining (ASGM), Colombia, environmental conflicts, illegal gold mining, mercury pollution minamata convention on mercury, Peru, and South Africa. Cluster 5 (purple) is characterized by 16 nodes dominated by 4 topics: climate change, risk perception, trust, and expertise. There are also adaptation, disaster communication, fear, framing, journalism, media sociology, mitigation, politics, public opinion, science, television, and uncertainty. Cluster 6 (light blue) is characterized by 11 nodes. The topics are chiadzwa, diamonds, environmental governance, environmental management, environmental pollution, extractive sector, illegal miners, resources, sustainability, violence, and Zimbabwe. Cluster 7 (orange) is characterized by 11 nodes. The topics are artisanal gold mining, Ghana, marginalization, political ecology, pollution, power relations, small-scale mining, social justice, water, water pollution, and water quality. Cluster 8 (brown) is characterized by 9 nodes. The topics include artisanal and small-scale mining, artisanal miners, fair trade, livelihoods, poverty, Sierra Leone, sub-Saharan Africa, sustainable development, and youth. Cluster 9 (in pink) is characterized by 6 nodes dominated by 3 topics artisanal and small-scale mining, capacity building, and gold mining. Furthermore, there are rural, socio-economic, and zamfara. Cluster 10 (in light orange) is characterized by 5 nodes: artisanal small-scale mining, ASGM, contamination, economic, and sustainable mining. Cluster 11 (light green) is characterized by 5 nodes: Africa, content analysis, decentralization, legal consciousness, and mining cooperatives. Cluster 12 (in grey) is characterized by 2 nodes: artisanal mining and cluster.

The next process was to divide these author keywords into three periods to determine the development of the study topic. In Period I (1987-2000), 4 author keywords were found as illustrated in Fıgure 7 and Table 5. The findings present 1 cluster characterized by 4 nodes, consisting of Brazil, consensus building, small-scale mining, and Quary. In this period, there are still very limited topics discussing governmental artisanal mining. Then, in Period II (2001-2010) 92 author keywords were found. The display is presented in Fıgure 8. and Table 5 presenting a diverse study area by creating 9 clusters

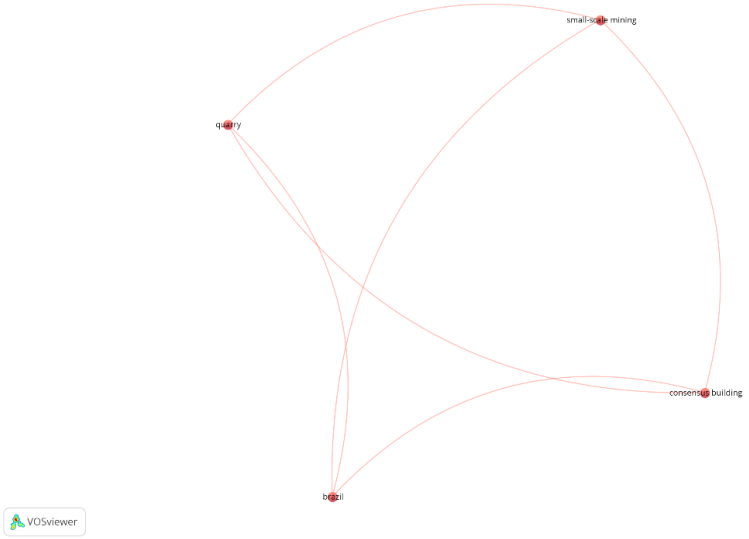


Figure 7. Author keywords in period 1 (1987-2000)

Cluster 1 (red) is characterized by 11 nodes dominated by 2 topics: mining and socio-economic. Then, these are followed by other topics such as dwellers, impact, rural, environmental, income generating activities, gold mining, Geita district, local people, and mining activities. Cluster 2 (green) is characterized by 10 nodes dominated by 2 topics mercury pollution and small-scale mining. Furthermore, there are such topics as processing centres, clean technologies, mineral processing, South Africa, abandoned mines, artisanal mining regulation, artisanal gold mining, and public perception. Cluster 3 (blue) is characterized by 8 nodes dominated by the topic of Regulation. Furthermore, there are Papua New Guinea, environmental effects, China, Asia Pacific, harare guidelines, Philippines, and Indonesia. Cluster 4 (yellow) is characterized by 7 nodes dominated by 2 topics: Ghana and gold. However, there are also other topics such as conflict, livelihoods, fair trade, tropical commodities, and land tenure. Cluster 5 (purple) is characterized by 6 nodes, dominated by the topic of galamsey. This is followed by resistance, development, community, women, and international mining companies.

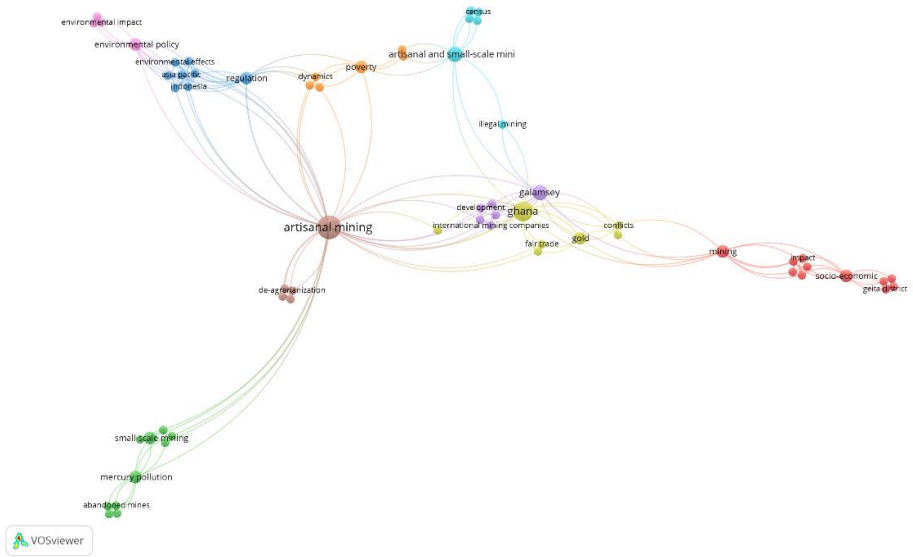


Figure 8. Author keywords in Period II (2001-2010)

Cluster 6 (light blue) is characterized by 6 nodes, dominated by the topic artisanal and small-scale mining. Furthermore, the topics are illegal mining, mercury, developing countries, census, and sustainable livelihoods. Cluster 7 (orange) is characterized by 6 nodes are dominated by the topic of poverty. Other topics include dynamics, minerals, census data, geological information, and tenure. Cluster 8 (brown) is characterized by 5 nodes, dominated by the topic of artisanal mining. Further issues are reagrarianization, deagrarianization, livelihood diversification, and sub-saharan Africa. Cluster 9 (pink) is characterized by 4 nodes are dominated by

the theme of environmental policy. Other issues include environmental impact, management, and small-scale mining. Furthermore, keyword analysis in Period III (2011-2023) found 121 author keywords. Figure 9 presents an increasingly diverse study area by creating 13 clusters.

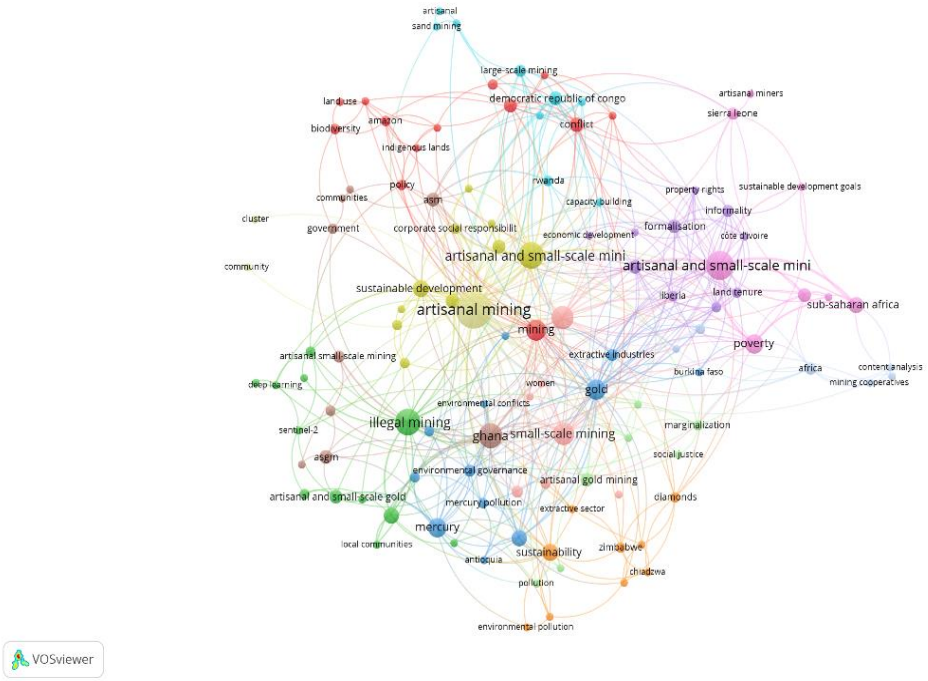


Figure 9. Author keywords in period III (2011-2023)

Cluster 1 (red) is characterized by 13 nodes dominated by 4 studies mining, governance, conflict, and natural resources. Other topics are Amazon, biodiversity, Democratic Republic of Congo, indigenous lands, indigenous people, land use, *Madre de dios*, policy, and political economy. Cluster 2 (green) is characterized by 12 nodes dominated by 3 topics: illegal mining, galamsey and artisanal and small-scale gold mining. Other topics are deep learning, deforestation, environmental management, google earth engine, illegal mining, local communities, remote sensing, resource curse, sentinel-2, and stakeholders. Cluster 3 (blue) is characterized by 12 nodes are dominated by 3 topics: mercury, gold, and Colombia. Then, these are followed by other topics like extractive industries, environmental governance, mercury pollution, Burkina Faso, Antioquia, artisanal and small-scale gold mining (ASGM), environmental conflicts, *minamata* convention on mercury, and post conflicts. Cluster 4 (yellow) is characterized by 10 nodes dominated by 5 topics: artisanal mining, artisanal small-scale mining, sustainable development, gold mining, and South Africa. Other topics are abandoned mines, corporate social responsibility, development, illegal gold mining, Peru, and Zamfara.

Cluster 5 (purple) is characterized by 10 nodes dominated by 3 topics: formalization, informal economy, and informality. Furthermore, there are topics such as Africa mining vision, economic development, land tenure, legal pluralism, Liberia, and property rights. Cluster 6 (light blue) is characterized by 9 nodes dominated by 3 topics Democratic Republic of Congo, large-scale mining, and Rwanda. Then, these are followed by other topics artisanal, capacity building, coltan, conflicts minerals, resistance, and sand mining. Cluster 7 (orange) is characterized by 9 nodes dominated by 3 topics: sustainability, diamonds, and Zimbabwe. Other topics are environmental pollution, extractive sector, illegal miners, resources, and violence. Cluster 8 (brown) is characterized by 9 nodes dominated by 4 topics: Ghana, ASGM, artisanal small-scale mining, and sustainable mining. These are followed by the topics of Indonesia, communities, government, and mine closure. Cluster 9 (pink) is characterized by 8 nodes dominated by 4 topics: artisanal and small-scale mining, poverty, sub-saharan Africa, and livelihoods. These are followed by other topics artisanal miners, Sierra Leone, sustainable development goals (SDGs), and youth. Cluster 10 (light orange) is characterized by 7 nodes dominated by 2 topics: formalization and small-scale mining. Other topics are the Philippines, public policy, water pollution, water quality, and women.Cluster 11 (light green) is characterized by 7 nodes dominated by the topics of artisanal gold mining and marginalization. Other topics are political ecology, pollution, power relations, social justice, and water. Cluster 12 (sky blue) is characterized by 6 nodes dominated by the topic of Africa and natural resource governance. Then, these are followed by other topics such as content analysis, decentralization, and legal consciousness, mining cooperatives. Cluster 13 (light yellow) is characterized by 3 nodes, the topics of which are artisanal mining, cluster, and community.

Table 5. Research topic and list of leading papers

A	B	C	D
Study Area of Governmental Artisanal Mining 1987-2000			
1	4	Brazil, Consensus Building, Quary, and Small-Scale Mining	The stone forum: Implementing a consensus building methodology to address impacts associated with small mining and quarry operations (Peiter et al., 2000)
Study Area of Governmental Artisanal Mining 2001-2010			
1	11	Mining and Socio-Economic	Impacts of mining on income generating activities of rural dwellers in Itesiwaju local government area of Oyo state, Nigeria (Oladeji et al., 2010) The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita District (Kitula, 2006)
2	10	Mercury Pollution and Small-Scale Mining	Clean artisanal gold mining: A utopian approach? (Hinton et al., 2003) Abandoned artisanal gold mines in the Brazilian Amazon: A legacy of mercury pollution (Veiga & Hinton, 2002)
3	8	Regulation	The dynamics of artisanal and small-scale mining reform (Sinding, 2005) Abandoned artisanal gold mines in the Brazilian Amazon: A legacy of mercury pollution (Veiga & Hinton, 2002)
4	7	Ghana and Gold	Fair trade gold: Antecedents, prospects and challenges (Gavin Hilson, 2008) Strained relations: A critical analysis of the mining conflict in Prestea, Ghana (Gavin Hilson & Yakovleva, 2007)
5	6	Galamsey	Soon there will be no one left to take the corpses to the morgue: Accumulation and abjection in Ghana's mining communities (Bush, 2009) Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots (Banchirigah, 2008) Strained relations: A critical analysis of the mining conflict in Prestea, Ghana (Gavin Hilson & Yakovleva, 2007)
Study Area of Governmental Artisanal Mining 2001-2010			
6	6	Artisanal and Small-Scale Mining	Diamonds, governance and 'local' development in post-conflict Sierra Leone: Lessons for artisanal and small-scale mining in sub-Saharan Africa? (Maconachie, 2009)
7	6	Poverty	The dynamics of artisanal and small-scale mining reform (Sinding, 2005) How has a shortage of census and geological information impeded the regularization of artisanal and small-scale mining? (Gavin Hilson & Maponga, 2004)
8	5	Artisanal Mining	Influence of land tenure practices on artisanal mining activity in Ghana (Nyame & Blocher, 2010) Deagrarianization, reagrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities (Banchirigah & Hilson, 2010) Fair trade gold: Antecedents, prospects and challenges (Gavin Hilson, 2008) The dynamics of artisanal and small-scale mining reform (Sinding, 2005) Clean artisanal gold mining: A utopian approach? (Hinton et al., 2003) Abandoned artisanal gold mines in the Brazilian Amazon: A legacy of mercury pollution (Veiga & Hinton, 2002)
9	4	Environmental Policy	Opportunities for environmental management in the mining sector in Asia (Burke, 2006) Environmental management of small-scale and artisanal mining: The Portovelo-Zaruma goldmining area, southern Ecuador (Tarras-Wahlberg, 2002)
Study Area of Governmental Artisanal Mining 2011-2023			
1	13	Mining, Governance, Conflict, and Natural Resources	Terr(it)or(ies) of Peace? The Congolese Mining Frontier and the Fight Against "Conflict Minerals" (Vogel & Raeymaekers, 2016)
2	12	Illegal Mining, Galamsey and Artisanal	Zama-Zama mining in the Durban Deep/Roodepoort area of Johannesburg, South Africa: An invasive or alternative livelihood? (Nhlengetwa & Hein,

		and Small-Scale Gold Mining	2015) Socio-demographic factors affecting artisanal and small-scale mining (galamsey) operations in Ghana (Baddianaah et al., 2022) Local perspectives on the adverse environmental effects and reclamation of illegally mined degraded landscapes in North-western Ghana (Baddianaah et al., 2023) Impact of the ban on illegal mining activities on raw water quality: A case-study of Congo water treatment plant, Ashanti region of Ghana (Bawa et al., 2022) A review from environmental management to environmental governance: paradigm shift for sustainable mining practice in Ghana (Li et al., 2021)
3	12	Mercury, Gold, and Colombia	Territorial peace and gold mining in Colombia: local peace building, bottom-up development and the defence of territories (Le Billon et al., 2020) Contested diamond certification: Reconfiguring global and national interests in Zimbabwe's Marange fields (S. J. Spiegel, 2015a) Managing artisanal and small-scale mining in forest areas: Perspectives from a post-structural political ecology (HIRONS, 2011)
4	10	Artisanal Mining, Artisanal Small-Scale Mini, Sustainable Development, Gold Mining, and South Africa	Corporate social responsibility and artisanal mining: Towards a fresh South African perspective (Bester & Groenewald, 2021) Artisanal and Small-Scale Mining as a challenge and possible contributor to Sustainable Development (Zvarivadza, 2018) Resolving artisanal and small-scale mining challenges: Moving from conflict to cooperation for sustainability in mine planning (Zvarivadza & Nhleko, 2018)

Study Area of Governmental Artisanal Mining 2011-2023

5	10	Formalisation, İnformal Economy, and İnformality	Going for gold: Transitional livelihoods in Northern Ghana (Gavin Hilson et al., 2013) Industry approach to the conflict minerals legislation (Connors, 2012)
6	9	Democratic Republic of Congo, Large Scale Mining and Rwanda	Artisanal copper mining and conflict at the intersection of property rights and corporate strategies in the Democratic Republic of Congo (Katz-Lavigne, 2019) Addressing the capacity building challenge in the mining sector in Rwanda: The implications of Rwanda's 2014 mining and quarry law (Nwapi, 2017)
7	9	Sustainability, Diamonds, and Zimbabwe	Formal mining investments and artisanal mining in southern Madagascar: Effects of spontaneous reactions and adjustment policies on poverty alleviation (Canavesio, 2014)
8	9	Ghana, ASGM, Artisanal Small-Scale Mining, and Sustainable Mining	Informal artisanal and small-scale gold mining (ASGM) in Ghana: Assessing environmental impacts, reasons for engagement, and mitigation strategies (Achina-Obeng & Aram, 2022) Planning for the effective and sustainable management of Ghana's artisanal small-scale gold mining industry (Wireko-Gyebi et al., 2022) Narrowing the gap between local standards and global best practices in bauxite mining: A case study in Malaysia (Kuan et al., 2020)
9	8	Artisanal and Small-Scale Mini, Poverty, Sub-Saharan Africa, and Livelihoods	The ‘Zambia Model’: A blueprint for formalizing artisanal and small-scale mining in sub-Saharan Africa? (Gavin Hilson, 2020) Artisanal and small-scale mining (ASM) in sub-Saharan Africa: Re-conceptualizing formalization and ‘illegal’ activity (Gavin Hilson et al., 2017) Ethical minerals: Fairer trade for whom? (Gavin Hilson et al., 2016) Artisanal gold mining and rural development policies in Mozambique: Perspectives for the future (Dondeyne & Ndunguru, 2014)
10	7	Formalization and Small-Scale Mining	Innovation for sustainable development in artisanal mining: Advances in a cluster of opal mining in Brazil (Milanez & Puppim de Oliveira, 2013)
11	7	Artisanal Gold Mining and Marginalization	Digging for Gold or Justice? Misrecognition and Marginalization of “Illegal” Small-Scale Miners in Ghana (Ofori & Ofori, 2018) Zama-Zama mining in the Durban Deep/Roodepoort area of Johannesburg, South Africa: An invasive or alternative livelihood? (Nhlengetwa & Hein, 2015)
12	6	Africa and Natural	Formalization as Development in Land and Natural Resource Policy (Putzel et

		Resource Governance	al., 2015)
13	3	Artisanal Cluster and Community	Mining, Application of MCDM in evaluating emerging technology for artisanal mining

Information:
A = Cluster,
B = Number of Nodes,
C = Area of Research Focus, and
D = Lead Papers in Terms of Total Link Strength

To see the development of the topic of study on governmental artisanal mining, a summary is also presented in the form of topics and literature references per period. Through this mapping of literature studies, future researchers or writers are expected to get a reference in developing study topics and literature, they will refer to. Table 5 summarizes the topics of publication and the leading literature.

According to the author's keywords, the dominant topic is artisanal and small-scale gold mining, with studies on environmental issues, especially the impact of mercury, and its impact on socio-economic conditions and conflict. Morante-Carballo et al. (2022) also clarifiedit through mapping four areas of study on artisanal and small-scale mining related to social condition factors, environmental and health impacts of mercury, and mining as an alternative livelihood. This provides an opportunity for other topics such as types of artisanal mining other than gold, other global south countries, as well as political and resource issues including the identity of local communities, to be researched further given the limited discussion of these topics. In addition, the concept of "governmentality" has not been widely discussed by the authors. There is an opportunity for qualitative research studies to explain further the concept of governmentality from various perspectives, for example, critical social studies can use Michael Foucault's concept of power (Burchell et al., 1993; Ettlinger, 2011; Larner & Walters, 2004).

The study of artisanal and small-scale gold mining is an issue that has long attracted the interest of not only publications in the Scopus database but also Galvin Hilson as an author (Hilson, 2005; Hilson, 2005b, 2005a, 2006, 2016b, 2018a, 2018b, 2020, 2021; Hilson et al., 2017, 2019, 2020; Hilson & Banchirigah, 2009; Hilson & Maconachie, 2017; Hilson & Mcquilken, n.d.). This can be seen through a number of his publications. Bibliometric literature studies still using the concept of artisanal and small-scale mining as one of its variables tend to continue to refer to Galvin Hilson as one of the influential authors (Sununianti & Nugroho, 2023). We noticed that there is a positive relationship between topics, influential authors, countries, and publishers regarding the theme of governmental artisanal mining. The theme of artisanal and small-scale mining tends to be the focus of author Galvin Hilson's studies. Coming from the United Kingdom, he does not encounter any significant obstacles in conducting research, development, or publication. Moreover, the global north country also has more resources for publishing reputable research. Thus, networking in collaborative writing or research becomes an added value difficult to compare with authors from countries in the global south.

This bibliometric study is very supportive of mapping literature studies during the COVID-19 pandemic. The abundance of metadata can be an opportunity and clue to conduct further research or mentoring activities. Artisanal and small-scale mining studies related to the COVID-19 pandemic are still very limited. Kyaw et al. (2021) discuss health assessment tools as a reference for future health assessments using a transdisciplinary approach and online method. Hilson (2021) explained that the impact of the COVID-19 pandemic on the ASM community in Africa has helped shape self-organization and adaptation to the effects of lockdown measures and reduced productivity due to reduced mobility of labour, capital, and equipment due to disconnection from international markets. This moment has revived discussions about ASM as an important livelihood in Africa that is not immune to the shocks of Covid-19, making it important to define the role of this sector in regional development. However, the direct relationship between artisanal mining practices and COVID-19 pandemic has not been reviewed or published in the Scopus database.

Conclusion

This mapping of literature study shows that the topic of governmental artisanal mining has developed significantly since 2008 until now. Generally, the publications are scientific articles and the majority have been indexed by Scopus. The field of study tends to be in the aspect of social science and commonly discussed topics around artisanal and small-scale gold mining that have an impact on social life, health, and the environment. Galvin Hilson is reputable to remain to be an impactful author with the "artisanal mining" being the search keyword . Global north countries tend to dominate publications and networking on similar topics, while global

south countries tend to have limited objects of study or places where the practice of artisanal and small-scale gold mining takes place.

Future studies can complement this study with field research raising issues from the social critical perspective of resource governance, local politics, and local community values including other types of artisanal mining. In addition, further bibliometric studies can also complement it by using other data sources, combined data processing, or using other software. Thus, the limitations of distance and physical environment, such as the outbreak of the COVID-19 pandemic will notbe a barrier to research development.

Scientific Ethic Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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Abstract: Nowadays, the development of information and communication technology is running very rapidly. Geography education has a prominent role in ecosystem sustainability and cultural development, which is influenced by geographic data. Learning in the 21st Century with technological developments has increased. Geographic Information Systems (GIS) have become essential in changing how geography is understood and supported in the 21st century. Therefore, this research was conducted to investigate the role of Geographic Information Systems (GIS) in improving the quality of geography education. This research uses the PRISMA 2020 systematic literature review method using Scopus and Google Scholar as the database. A total of 101 articles were collected, but only 12 articles met the criteria for qualitative-thematic analysis. Research findings based on a systematic literature review state that there are two subject areas for using GIS in geography education: secondary schools and higher education. GIS in secondary school-level geography teaching, focuses on the output of increasing students' understanding and knowledge of spatial thinking. The aim of implementing GIS in higher education places greater emphasis on practical benefits in future geographic education development.

Keywords: Geography education, Systematic literature review, Geographic information system.

Introduction

The development of the 21st Century is marked by the use of information and communication technology (ICT) in all aspects of life. The rapid development of ICT impacts various sectors (Sakarneh et al., 2022) including in the field of education. The impact of ICT developments has brought a shift in learning paradigms worldwide towards modern learning. The use of technology as a learning medium is commonly used as an effort to anticipate the challenges of the Industrial Revolution 4.0. The learning process in the 21st Century must meet the demands of 4C skills (critical thinking, creativity, collaboration, and communication) (Ye & Xu, 2023). Various learning adjustment actions were taken to support this.

The issue of geography learning, which seems dry to students, has been developing for a long time. Some students think that geography lessons only consist of memorization. Geography teachers are often fixated on using classical methods in teaching through lectures and questions and answers, resulting in little use of learning media. One of the significant opportunities to revive geography learning is through the Geographic Information System (GIS). GIS is a relevant tool in supporting geographic learning to observe the natural world around us (Rød et al., 2010). For geography teachers, proficiency in using geographic information system (GIS)-based technology is essential to support educational programs. As a medium for teaching geography, GIS can improve students' understanding of geographic concepts (West, 2007). Not only that, GIS can help students

develop critical thinking skills in understanding space so they can find solutions to the problems they see (Baker et al., 2015; Liu et al., 2010; Tomaszewski et al., 2015). Much potential can be developed through the use of GIS in education. Often, the main obstacle geography teachers face in teaching GIS material is their need for mastery of GIS material, which becomes an obstacle in understanding and delivering the teaching material. Strategies are needed to support teachers' needs in developing GIS skills and experience in schools. Collaboration between schools and universities in the GIS industry is the scope of application (Healy & Walshe, 2019; Manson et al., 2013). This is a challenge for geography teachers to be able to utilize technology optimally to facilitate innovative learning.

The best effort to answer GIS implementation problems is through integration into geography education. Seeing this problem, the author is interested in conducting systematic literature review (SLR) research on using GIS in Geography education in the 21st Century. SLR is used to find information related to the use of GIS as a learning support at a level of geography education. Many studies focus on using GIS but still need a comprehensive, in-depth, and detailed analysis of the results. This research provides something new regarding the scope and framework for integrating GIS in geography education. It is hoped that this work can provide a scientific contribution not only limited to cognitively improving the quality of education. The main aim of the research is to answer two questions: 1) What is the scope of the subject and material for using GIS in geography education? 2) How can the objectives of using GIS in geography education be achieved?

Method

This research is a thematic-qualitative type of research—systematic literature review method. The purpose of this method is to identify, evaluate, and interpret the results of previous research that are relevant to a particular topic so that they are interesting to study (Calderón & Ruiz, 2015). Regarding the context of this study, the topics studied are related to GIS, which is part of geography education learning. To ensure that this study was conducted systematically, this study consulted the PRISMA 2020 guidelines (Page et al., 2021). The data search was performed on September 10, 2023, using Scopus and Google Scholar database sources. Specifically, for the Google Scholar database, searches were performed using Harzing's Publish or Perish application. Researchers search for journals that match the research topic by using keywords to make searching more accessible, such as "GIS," "education," and "geography." The search strings used in two databases, namely Google Scholar and Scopus, are shown in Table 1.

Table 1. Swarch strategy

Google Scholar	Scopus
TITLE (“GIS” and “geography education”)	TITLE-ABS-KEY (“GIS” AND “geography education”)

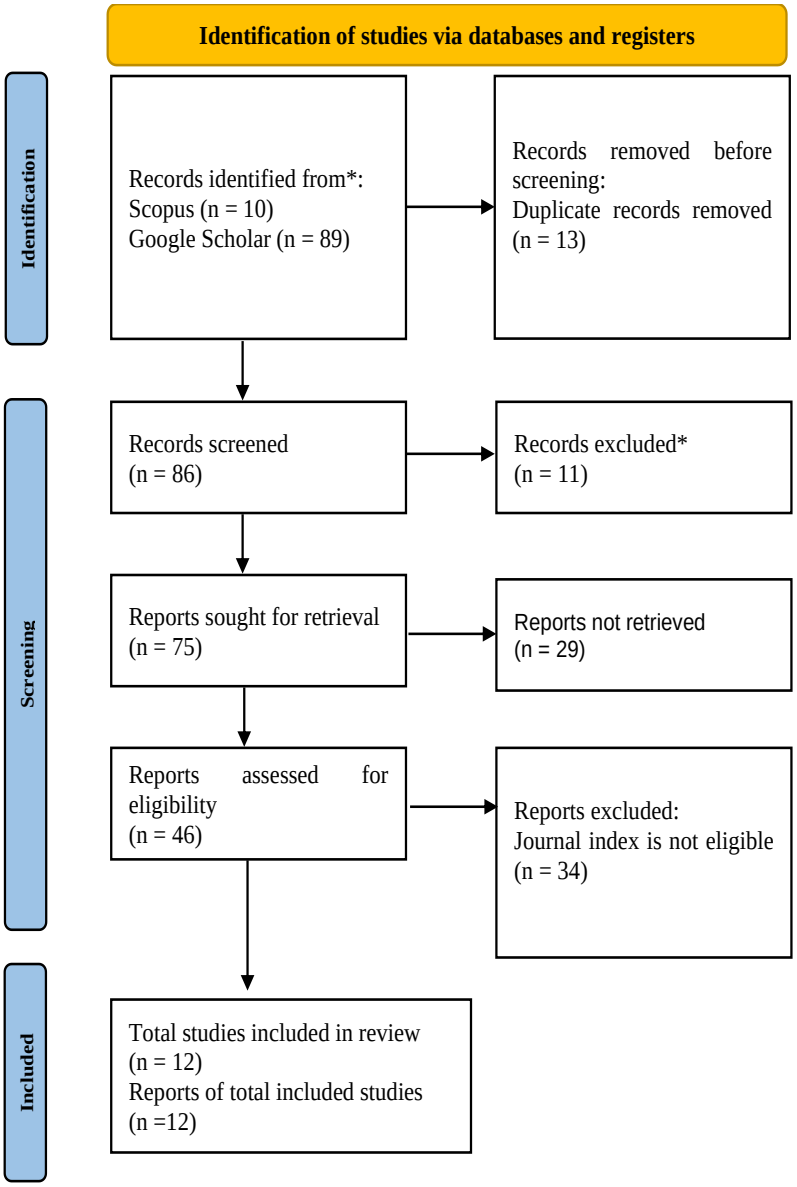
The data obtained was 101 articles (89 Google Scholar and 12 Scopus articles) based on these keywords. Next, the data is filtered and evaluated to obtain relevant articles. The criteria used can be seen in table 2.

Table 2. Eligibility criteria

Inclusion Criteria	Exclusion Criteria
Article published within the time frame of 21 Century (2001 to 2023)	Article or proceeding not indexed by Scopus or Google Scholar
The Written content was either in English language	No empirical research on GIS in geography education
The article is research result a peer review journal or proceedings	Subjec unrelate to high school and higher education
Article were available full text acces	

In selecting and evaluating relevant and structured articles, the researchers used the Microsoft Excel application for the coding, sorting, and data analysis processes. After going through a selection process that refers to the criteria, 12 out of 101 articles met the criteria. The more detailed process of selecting articles can be seen in Figure 1. The selected papers were then analyzed using the method described (Miles & Huberman, 2014) and followed the steps suggested, namely: (1) data classification, which was performed using Microsoft Excel software to facilitate selection and focus on essential points relevant to the study; (2) Data presentation in the form of tables, legends, and graphs showing interrelationships among categories. (3) conclude to answer previously formulated research questions. By performing these steps, it was hoped that a comprehensive

summary of the results would be obtained for thematic discussion, leading to the desired contribution to the body of knowledge.



* Not relevant with inclusion criteria

Figure 1. Selection process (Page et al., 2021)

Results and Discussion

The research results obtained 12 articles that met the inclusion and exclusion criteria. Table 3 shows 12 articles related to the use of GIS in geographic education.

Subject and Material Scope of Utilization of GIS in Geography Education

The integration of GIS into geographic education is integral to the concept of technology-based 21st century learning. This learning emphasizes the use of programming systems designed to support geography learning. Course design and instructor characteristics are the most important factors that determine students' actual use of an online learning system (Almaiah, 2019). Referring to Table 3, the scope of the use of GIS that can be identified is presented in Figure 2 below:

Table 3. Application of GIS in geography education

Study	Code	Autthor and Year	Result
(DeMers, 2019)	1	Michele De Mars, 2019	The use of a retrospective learning approach in teaching GIS allows students to understand and strengthen understanding of the concept that there are many problems with GIS tools and they are not static.
(Lukinbeal & Monk, 2015)	2	Chris Lukinbeal, 2015	Build a professional educational perspective and the skills geography students need to find employment
(Yağbasan & Yılmaz, 2021)	3	Ozlem Yabasan, 2021	Increase level of perception of spatial variation skills
(Yuk Yong, 2014)	4	Yukyong, 2014	Government support in the integration of information systems and geographic aspects of GIS has a major impact on geographic education in the future.
(Wang & Chen, 2013)	5	Yao Hui Wang, 2013	Promotion of GIS education It also proposes strategies for further extending GIS education to other levels.
(Kakhramon, 2023)	6	Sabirov, 2023	GIS functions that contribute to the development of spatial geographic thinking
(Knobelsdorf et al., 2017)	7	M Knobels, 2017	Connecting CS Education to the field of Geography reaching out to students that usually are not exposed to CS Education.
(Liu et al., 2010)	8	Yan Liu, 2014	GIS technology can be used as an effective pedagogical tool to develop students' higher-order learning skills.
(Incekara, 2010)	9	S Incekara, 2010	Effective integration of technology in geography learning and increasing students' understanding of geographic concepts through GIS applications
(Tas & Finchum, 2005)	10	Hi Tas, 2005	Improving the quality, accessibility and distribution of GIS education in various academic institutions by considering institutional capacity and geographical areas.
(Vir Singh & Asst Professor, 2017)	11	PV Singh, 2016	Innovative smart classrooms in India have adequate ICT facilities and trained human resources for GIS implementation
(Scheepers, 2009)	12	D Scheepers, 2006	Universities play an important role in creating educators and prospective educators who are more competent in GIS so that teachers do not just impart knowledge.

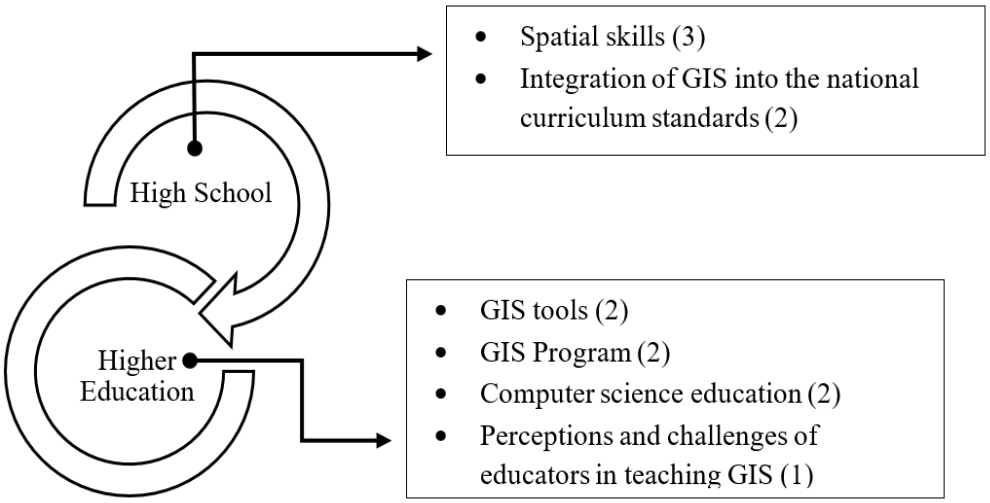


Figure 2. Subject and material scope utilization of GIS tion process (Page et al., 2021)

Based on Figure 2, it can be explained that the use of GIS in geography education is not only applied within the scope of higher education but is also widely used in learning in secondary schools. Differences in GIS implementation material can be seen at the level of education. The GIS material implemented at the secondary school level emphasizes aspects of knowledge, abilities, and integration of GIS into the school education curriculum. Geospatial technology learning design is one of the crucial aspects required in the geography learning curriculum (Kerski, 2003; Ridha & Kamil, 2021). GIS aspects in learning in secondary schools can expand students' spatial abilities and can even improve students' spatial thinking (McLaughlin & Bailey, 2022). Therefore, using GIS that can be carried out in the scope of schools or higher education can optimize the geography education process.

In contrast to the scope of GIS implementation in higher education, the use of GIS places more emphasis on applicable aspects such as programming and GIS in looking at future employment opportunities. Work carried out using GIS makes the work done more efficiently and effectively (Kholoshyn et al., 2019). Implementing GIS in higher education is also intended to produce teachers who are competent in learning geography. GIS teacher professional development and actually seeing long-term classroom implementation (Collins & Mitchell, 2019). In other words, integrating GIS into the geography education process is crucial to produce individuals who are ready to face global challenges, including in the 21st-century era. The use of GIS in the geography education process tends to be flexible according to the needs and potential of resources in the study country so that it can contribute to producing a resource with spatial competencies as the foundation for responding to the challenges of technological change.

Classification of Results from GIS Implementation in Geography Educationnd Material Scope of Utilization of GIS in Geography Education

Researchers carry out classifications based on the impact of the results of GIS implementation in geographic education. Classification of 12 research articles, there are two articles with the impact of implementation on innovation in the use of GIS, two articles with the results that GIS has a significant impact on geographic education in the future to find employment, two articles with the impact of creating more competent teaching staff in the field of GIS, 1 article has an impact on understanding of GIS tool problems, 1 article on expanding GIS education to other levels, and four articles have an impact on increasing students' understanding of spatial thinking geographic—figure 3 classification based on the results of the measured impact of GIS implementation.

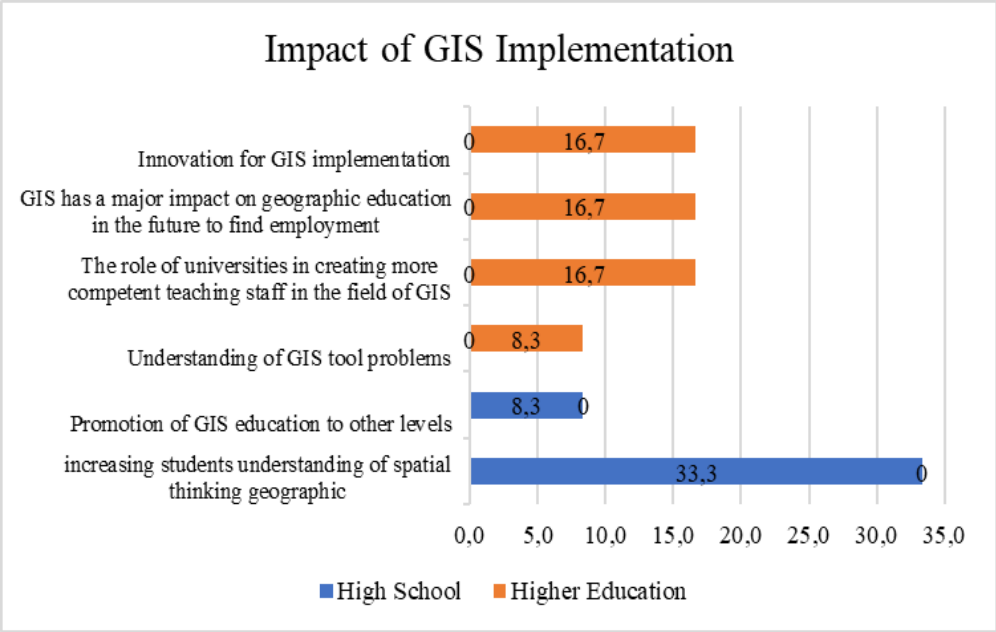


Figure 3. Result GIS implementation in geography education

The classification of results from the application of GIS in geography education in terms of achieving objectives overall states that the application of GIS in learning at the secondary school level can improve students' understanding of spatial thinking. Studying geography using GIS as a teaching and learning medium is very effective. This condition allows students to observe geographic problems in actual visuals to transfer knowledge

and understanding based on what they see. Students use a manual map or atlas to apply learning treatment before using GIS, so, the involvement and experience that students get needs to be improved. So, with GIS in geography learning, learning becomes more effective (Lee & Bednarz, 2009; Schlemper et al., 2019; Schulze et al., 2012). The classification of the results of the application of GIS in higher education places more emphasis on the realm of concrete implementation, such as increasing the competence of prospective educators and experts in the field of GIS and developing innovations from GIS programs for learning in higher education.

A problem often arises in introducing GIS into teaching is a lack of teacher training (Mínguez, 2022). Technological developments are gradually making GIS more user-friendly, so teachers' technological skills need to be improved. Improving GIS practices that focus on developing skills, competencies, and critical spatial thinking abilities can produce competent graduates (Bearman et al., 2016). The significant impact of GIS in education has resulted in many countries aggressively implementing GIS into the educational curriculum in schools and higher education.

Conclusion

During the last 21 years, namely 2002-2023, there were 12 relevant articles from Google Scholar and Scopus reviewing the use of GIS in geography education both in secondary schools and higher education. GIS-based geography education teaches the efficient use of technological developments in education. This will not only increase the potential for success in geography education but also contribute to making geography education more contextual through visual images that are close to students' lives, more varied because it can be implemented through various forms of application, and more comprehensive because it can not only be done within the scope of schools but also higher education to produce prospective educators who are competent in teaching.

The application of GIS in Geography education in secondary schools mainly discusses using varied learning models to improve students' geographical spatial thinking to obtain maximum learning outcomes. The application of GIS in Geography education in higher education emphasizes practical applications such as creating new programming for GIS development, preparing competent teaching candidates through training, and preparing experts to support geography education in the future. Many obstacles are found in implementing GIS in geography education, from the availability of supporting facilities to the government budget. However, in this case, several countries are making maximum efforts to apply GIS in the educational curriculum.

Recommendations

It is important to have a comprehensive approach to learning geography by involving GIS experts, educators, and education experts. Innovative learning models that utilize GIS, with an emphasis on evaluating the use of GIS can determine the extent of students' understanding and achievement in geography lessons. It should be noted that there are obstacles to implementing GIS in the curriculum. Research on the implementation of GIS in learning makes an important contribution to the development of geographic education based on GIS technology in the future.

Scientific Ethics Declaration

Eka Wulan Safriani., Iwan Setiawan., and Nanin Trianawati declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Acknowledgements or Notes

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Impact of Conditional Economic Transfers on Poverty: The case of Equator

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Abstract: This paper analyzes the impact of conditional cash transfers on poverty in the canton of Milagro, Ecuador. Several dimensions were postulated as possible factors influencing poverty rates and their reduction through the allocation of resources to beneficiaries, whose purpose is to improve their quality of life. The dimensions are framed within the scope of coverage, budget allocation, investment, economic characterization, poverty indices, level of improvement in the quality of life and allocation of the items received. The analysis is based on a review of the impact on the poverty of citizens, by conducting a focus group with personnel who work directly with beneficiary families. The study had a mixed approach and a descriptive-diagnostic and non-experimental cross-sectional or sectional design, since the data collection was determined in the period two thousand twenty-two. The findings found in the analysis suggest that poverty rates in the canton of Milagro have no relationship between access to the human development bond and the improvement in the quality of life of the beneficiaries.

Keywords: Cash transfers, Poverty, Quality of life

Introduction

Ecuador is one of the countries with abundant inequality in Latin America, ranking sixth in the region (Ruiz, 2023), these are due to a lack of opportunities and the high index of social injustice that is registered, hence poverty is the extreme level of inequality, which prevents families from not being able to meet their basic needs. A large number of inhabitants lack the necessary resources to guarantee their minimally dignified quality of life, while a small fragment of the population is evident on the opposite side.

In 2014, when all the oil bonanza came to an end, the reduction of inequity and inequality in Ecuador stagnated significantly and, with the pandemic, the gaps deepened. Based on the GINI coefficient that measures economic inequalities, where zero is perfect equality and one is complete inequality, in 2022 Ecuador placed 0.453 in the GINI Coefficient (Instituto Nacional de Estadística y Censos, 2022), results of the South American coefficient that places the country in fourth with the highest inequality in the region, behind Colombia, which has a coefficient of 0.51 and Brazil of 0.52 (Datos Macro, 2023)

At present, the allocation of Bonds and Pensions by the Ecuadorian government contemplates a coverage of 1,459,630 as of December 2022 (Ministerio de Inclusión Económica y Social, 2023) ,and implies a year-on-year increase of 0.22%. With regard to the users of the Human Development Bonus (BDH), this monetary transfer, in this same period, there is a year-on-year decrease of 710,812 users, which represented a 3.56% year-on-year drop in coverage, cases that may be due to the supposed overcoming of poverty based on the social registry (social survey) (Ministerio de Inclusion Económica y Social, 2023)

In this context, the Ministry of Economic and Social Inclusion (MIES), the governing body of cash transfers, aims to establish and systematically implement policies, regulations, strategies, programs and services aimed at attention during the life cycle, making the latter one of the most significant innovations in social policy in the last two decades. For this reason, Ecuador has been part of this trend with the creation of bonds and pensions

since 1998 and their subsequent transformation into a Human Development Bond in 2003 (Rosero Valencia & Ramos Aguilar, 2016)

With this background, cash transfers emerged as an instrument of social compensation that were part of a package of economic measures of social adjustment that included adjustment to fuel prices, seeking to reward through monetary retribution the most vulnerable groups in society as part of the neoliberal guidelines in which the elimination of subsidies for gas for domestic use were included. electricity and fuel. This article covers the basic dimensions such as: Scope of coverage, Budget allocation, investment, economic characterization, poverty indices, and level of improvement in quality of life.

The methodology to be used is based on a quantitative and qualitative approach, with an exploratory scope, with a non-experimental cross-sectional or sectional design, it is necessary to mention that the study is based on the year 2022. This paper aims to study the impact of conditional economic transfers on poverty in Ecuador. To this end, it proposes a documentary study in which primary source information is collected that reveals figures that are binding to the evolutionary process of this social compensation instrument, the results of which would allow the execution of future lines of research, as well as to rethink the change in the basis of the monetary transfer program in Ecuador. possibly making this a program that promotes sustainable development for vulnerable families in Ecuador.

Human Development Bond

The Human Development Bonus is a conditional cash transfer program (CCTP) aimed at families throughout Ecuador living in extreme poverty. The purpose is to encourage the accumulation of human capital and minimize the persistence of poverty. It consists of the delivery of a monetary incentive to guarantee a minimum level of consumption in families and encourage them to invest in the education and health of children under 18 years of age.

State Subsidies

Subsidies are considered as a series of actions carried out by the State to contribute to the well-being and improvement of the economic situation of social groups, especially those who are in vulnerable situations in a country. In this sense, the central government projects itself as a regulatory agent of the economy at the national level, in charge of focusing the application of these benefits and contributing to the improvement of the quality of life of the people with an equitable distribution of the resources that the nation possesses.

Subsidies in the economy and social welfare are justified by their scope, which implies obtaining a measure regarding the effectiveness of their application, considering that the poverty and unemployment rate in the country is significant. Therefore, if the subsidy on fuels and gas for domestic use was not effectively targeted from the outset, its reduction or elimination would lead to inequality in society. To this end, the Government must seek the necessary mechanisms and strategies to compensate citizens, because rural areas are not economically equal to urban areas, so any element that represents an increase in the cost of living affects the quality of living for those who have the least.

Social Protection in Ecuador

The Ecuadorian government has been promoting a series of in-depth processes in terms of social and economic inclusion policy in recent years. In this sense, the Social Protection system in Ecuador integrates a contributory and non-contributory scheme, where the first consists of the presence of three social security programs: the Ecuadorian Institute of Social Security (IESS), the Social Security Institute of the Armed Forces (ISSFA) and the Social Security Institute of the Police (ISPOL), in charge of covering workers in the formal market. using mandatory savings mechanisms. Despite the actions taken, coverage only reaches 40% of the country's population.

On the other hand, the majority of the population living in poverty and extreme poverty is covered by a non-contributory scheme: the Social Protection Network, which consists of a system of cash transfers implemented by the Ministry of Economic and Social Inclusion.

Given that consumer prices in the Ecuadorian economy have not undergone significant variations over time, the poverty and extreme poverty lines, since 2017, have remained almost constant. The June 2022 results showed an increase compared to the same month in 2021. In June 2022, considers a person to be income poor if he or she has a per capita household income of less than USD 87.6 per month and extremely poor if you earn less than USD 49.4 (Banco Central del Ecuador, 2022). (see Figure 1)

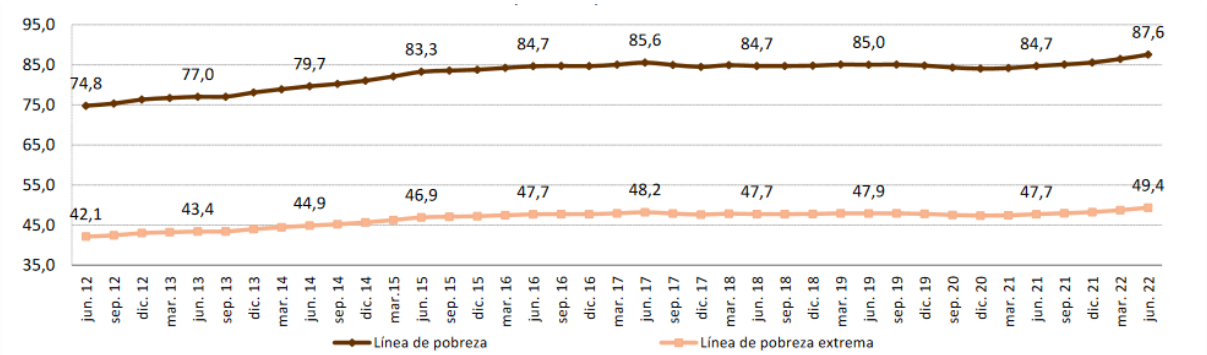


Figure 1. Poverty and extreme poverty lines in Ecuador (Author: Central Bank of Ecuador, Source: INEC, National survey of employment, unemployment and underemployment, ENEMDU)

Inequalities and Poverty in Ecuador

Social inequality has to do with the treatment they receive, as well as the benefits and opportunities that an individual has access to depending on their social, economic, ideological position, etc. Thus, in Ecuador, when analyzing from income, poverty rates have increased since 2017, reaching 30%, a reality that contrasts with the levels of economic inequality between households in the urban and rural sectors, whose gap is significant: determining a rural poverty index.

The analysis of poverty and income by household members by area showed that, in June 2022, households with more than six members in urban areas reached a poverty incidence percentage of 23.7%, a figure 11.9 points lower than that recorded in June 2021, which was 35.7%: while the average income figure was USD 61.1 in the reference month, i.e. USD 4.4 higher than in June 2021. In rural areas, the poverty rate in households with more than six members was 60.1%, considering it 8.4 points lower compared to the same month in 2021. Similarly, the average income was USD 48.7 higher by USD 8.7 compared to June 2021. (see Figure 4)

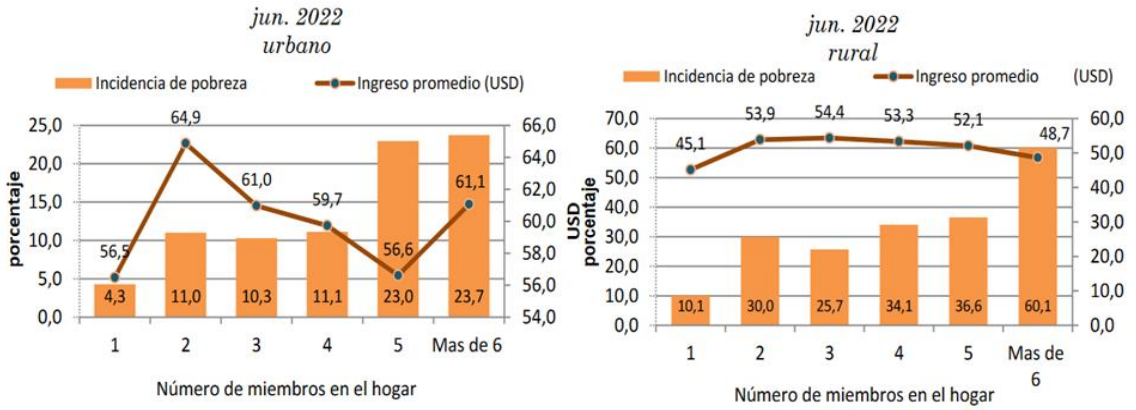


Figure 2. Poverty and income by household members. Author: Central Bank of Ecuador Source: ENEMDU

Conditional Cash Transfer Program in Latin America

According to CEPAL, conditional cash transfer programs have been the basis for innovation in social policy in Latin America. These programs are aimed at overcoming poverty and providing protection to people living in situations of exclusion, based on clear dimensions such as education, health and nutrition. Most of the countries in this region have opted for the use of this program. (See Figure 3)

Programas en operación		
País	Nombre del programa	Año de inicio
Argentina	Asignación Universal por Hijo para Protección Social	2009
	Programa de Ciudadanía Porteña	2005
Belice	*Building Opportunities for Our Social Transformation*	2011
Bolivia (Est. Plur. de)	Bono Juancito Pinto	2006
	Bono Madre Niño-Niña Juana Azurduy	2009
Brasil	*Programa Bolsa Família*	2003
	Programa Bolsa Verde	2011
	Programa de Erradicação do Trabalho Infantil	1996
Chile	Chile Solidario [a]	2002
	Subsistema de Seguridades y Oportunidades (Ingreso Ético Familiar)	2012
Colombia	Más Familias en Acción	2001
	Red Unidos	2007
Costa Rica	Avancemos	2006
Ecuador	Bono de Desarrollo Humano	2003
	Desnutrición Cero	2011
El Salvador	Programa de Apoyo a Comunidades Solidarias en El Salvador	2005
Guatemala	Mi Bono Seguro	2012
Haití	*Ti Manman Cheri tou nef*	2012
Honduras	Bono Vida Mejor	2010
Jamaica	*Programme of Advancement through Health and Education*	2001
México	Prospera	2014
Panamá	Red de Oportunidades	2006
	Bonos Familiares para la Compra de Alimentos	2005
Paraguay	*Tekoporã*	2005
	Abrazo	2005
Perú	Juntos	2005
República Dominicana	Progresando con Solidaridad	2012
Trinidad y Tabago	*Targeted Conditional Cash Transfer Program*	2006
Uruguay	Asignaciones Familiares – Plan de Equidad	2008

Figure 3. Conditional cash transfer programs in Latin America and the Caribbean. (Author: CEPAL)

Despite the programs that countries in Latin America place, it seems that they do not give successful results, being that it must be considered that COVID 19 is a point that has not allowed the fall of inequality in Latin American countries. (see Figure 4)

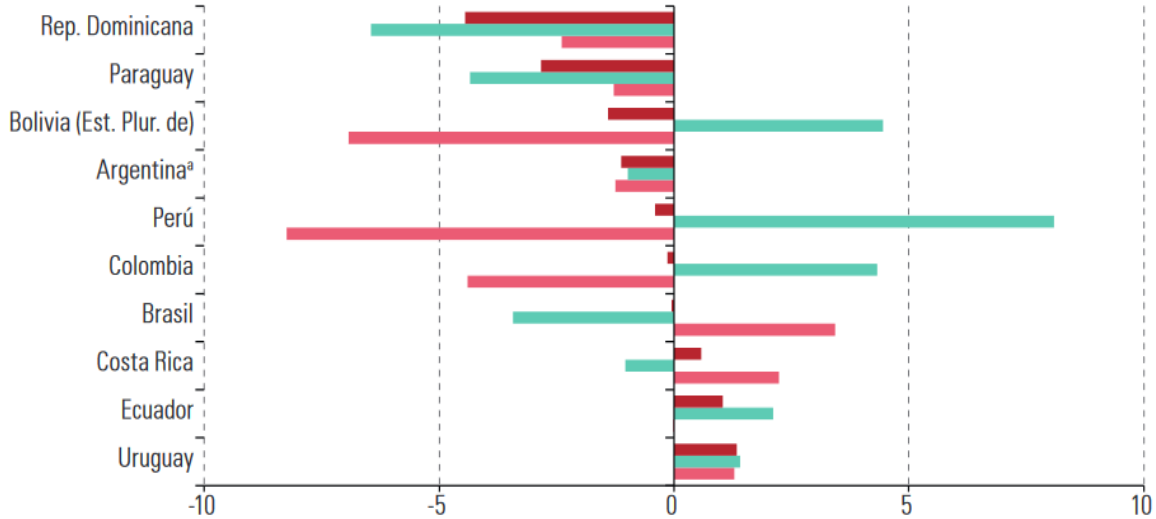


Figure 4. Annualized rates of change of inequality indicators, 2019-2021(Author: CEPAL)

Method

Methodological Design

Next, the methodology used in the study is described, detailing its scope, approach, design, categorization of variables, categories, definition of the population and observed sample. For this, the presence of quantitative and qualitative phases is determined.

Scope

The research is exploratory, because it determines the possibility of investigating statistical figures that determine the presence of a problem in the social and economic field in the locality subject to study.

Design

It is non-experimental, cross-sectional or cross-sectional, since data collection was determined in the 2022 period, considered as a single time and space without generating manipulation or systematic intervention by the researcher. It should be noted that the study also gathers individual and collective experiences of the impact generated by conditional cash transfers.

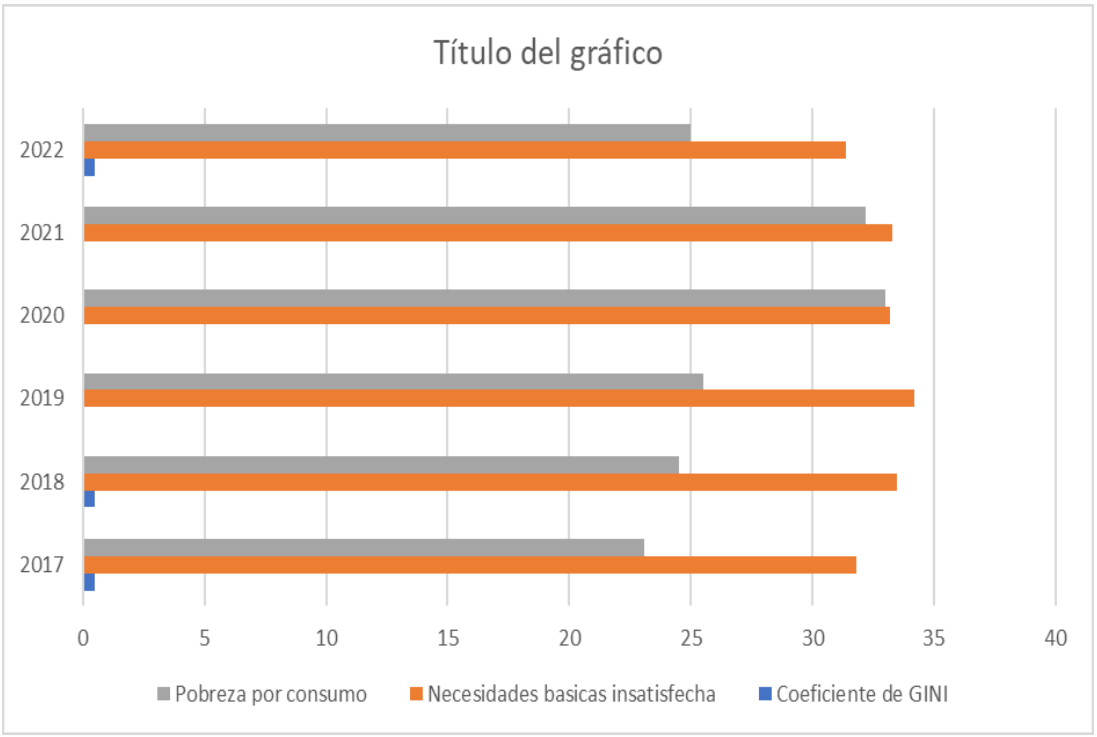
Data Analysis Techniques

Quantitative data collection was carried out through the review of reports provided by the Ministry of Economic and Social Inclusion, as well as the Ministry of Economy and Finance, statistical data from the National Institute of Statistics and Censuses, reports from the Central Bank of Ecuador and reports from the Economic Commission for Latin America and the Caribbean. whose analysis determined the impact of the Human Development Bond on the level of poverty. For the qualitative part, focus groups were developed, since no other type of data collection was allowed because it is a population considered vulnerable.

Results and Discussion

Poverty Indicators

Within the data analysis, the following can be reflected: the Gini Coefficient, which denotes the degree of inequality has increased in 2019, and the rest we can say that it has been maintained, taking into consideration all the programs and public policies that are implemented. Among the unsatisfied basic needs, it can be seen that from the period considered 2017 to 2022, it has been maintained, supplying their basic needs such as: health, housing, education and employment. Within consumption poverty, there has not been a great variation from 2021 to 2022, assuming that people in vulnerable situations have not shown significant changes. (see Figure 5)



Author :own Source: INEC

Users of the Human Development Bond

It is necessary to indicate that the Government carries out the program and serves as follows: 710,812 users receive this benefit, and the resource used is 1,459,630. (see Table 1)

Table 1. User and investment of human development bond (Ministry of economic and social ınclusion)

	Users	Investment
Human Development Bond	710,812	1459,63

From part of the information taken in the focus group, it has been analyzed that 56.02% consider that since they are beneficiaries of the Human Development Bonus, their improvement in quality of life is low and that this resource is enough to cover somewhat the products of the basic family basket, while 43.69% state that their improvement is medium since they have managed to generate additional income to the subsidy (see figure 5).

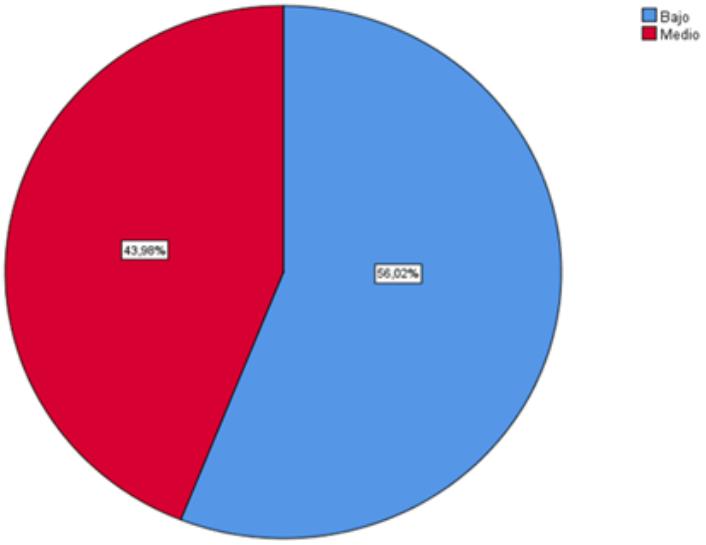


Figure 5. Quality of life of the beneficiaries of the Human Development Bond (Focus Group, 2023)

Overview of the Human Development Bonus

With regard to the perspectives that BDH beneficiaries have on access to the subsidy, 79.87% of the users consider that it is limited considering the number of children in the family nucleus; In other words, not all households can receive the USD 150 caps provided by the government. On the other hand, 20.13% consider it sufficient (see figure 6).

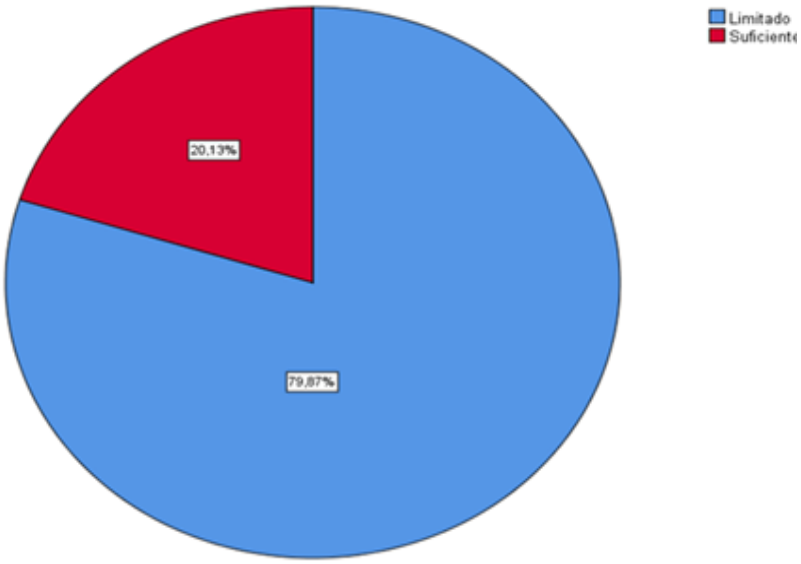


Figure 6. Overview of the human development bonus (Focus Group, 2023)

Taking into consideration the data previously analyzed, the causes were identified why the beneficiaries of the Human Development Bond did not generate some type of entrepreneurship, considering that the limited amounts granted by the government through this subsidy have prevented the generation of entrepreneurship initiatives; while another group claim that the lack of technical assistance from the agencies in charge has prevented the channeling of the funds from these cash transfers into improvements in the quality of life; and finally, there are certain cases in which the suspension of the BDH limits the process of reducing poverty rates in the families of the Milagro canton, especially during the pandemic when families had to access internet service and purchase mobile equipment, generating factors that disqualified them as beneficiaries. Within the whole study, it can be reflected that one of the situations that could be limiting for the collection of data is the situation of vulnerability of the population that receives the Human Development Bonus, this means that surveys cannot be applied directly due to this condition, since this could generate false expectations in the citizenry.

Conclusion

The Human Development Bond represents the Ecuadorian State's approach to programs based on the focus on social development and welfare in favor of disadvantaged groups at the national level. Thus, the literature review determines a series of changes and transformations since its inception in 1998, both in its form and substance, since over the years it has altered the transfer as conditional and unconditioned; In addition, it records the increase in the amount of subsidy and the number of beneficiaries, which calls into question its effectiveness, since the goal is the progressive reduction of poverty rates. The findings found in the evaluation suggest that poverty rates have no relationship between access to the Human Development Bond or the improvement of the quality of life of the beneficiaries.

This implies a zero incidence of the perceived value on the levels of perception of well-being possessed by the people who receive it, demonstrating the presence of very marked inequalities in the social group studied. In practice, there is no pertinent information to ensure that the Human Development Bond is projected as a factor in improving the quality of life of the beneficiaries, much less in reducing poverty rates. This, in turn, raises a series of questions about the impact and effectiveness of the application of this monetary transfer. What was evaluated through the intervention of people in the focus group carried out by the Technical Analysts of the Ministry of Economic and Social Inclusion, shows that there is no truthful information on what the items received are used for, which demonstrates a poor targeting of the subsidy in the monetary transfer system, bearing in mind that people with limited resources are the ones who have a higher level of priority for the usefulness of the amount assigned.

The results obtained from the research show the need to promote new lines of research, which should be aimed at improving the targeting of the Human Development Bond, in addition to promoting technical assistance to achieve access to ventures that replace the allocation of the resource and continue in a systematic cycle of false citizen comfort

Recommendations

According to the findings of this study, I can define that it is of great importance to reprogram the monetary transfer in Ecuador, in order to empower the citizenry and can give way to the reduction of poverty rates, as well as provide the quality of life of the citizens, for which it is recommended to strengthen the monitoring carried out by the Family Accompaniment technicians of the governing body Ministry of Economic Inclusion and Social, as well as strengthening the Human Development Credit, for the latter, reviewing the lines of financing, focusing correctly through the Social Registry and based on unsatisfied basic needs, carrying out the respective follow-up of the credits disbursed that corresponds solely and exclusively to the enterprises, in which compliance with it must be verified, they must carry out training on financial and administrative issues for the beneficiaries of the Human Development Credit, providing the respective accompaniment with frequent visits and advice.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

Acknowledgements or Notes

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* I am deeply grateful for the opportunity that this scientific article has allowed me to produce

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Ready, Click, Go! Evaluating the Readiness and Usability of an E-learning Portal from Students' Point of View

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Abstract: The world of education institutions has witnessed rapid developments in E-learning styles, especially in the past few years. These developments also included learning management systems (LMS). Such systems can be assessed using the technology acceptance model (TAM) and system usability scale (SUS). In this study, TAM and SUS were utilized to investigate the learning experience of engineering students on their LMS and their perception of its usefulness and accessibility. A field study of 200 users was conducted in this investigation. The results showed that 27% of students expressed a "good" and "excellent" usability experience with the LMS whereas 60% of students expressed an "average" experience. The results also showed that more than 50% of students agreed with the statements of perceived usefulness, but they were generally neutral with the ease-of-use of the LMS. Further, statistical results showed that students who had a positive experience with the LMS were statistically significantly more in agreement with its usefulness but not how easy it is to be used. This indicated that students could develop an attitude towards the LMS, thus affecting their actual use of the LMS. The study could potentially indicate the advantages and disadvantages of LMS's in terms of interaction and user experience from the students' point of view.

Keywords: E-learning, Education, TAM, SUS

Introduction

The teaching and learning processes are evolving swiftly worldwide now, transforming students and lecturers from traditional classrooms to virtual environments (Manasrah, et.al, 2022). This transformation was pushed by the availability of cheap communication devices like smartphones, tablets, and laptops as well as the accessibility of many free online platforms like YouTube, Facebook, Moodle, and others (Maziriri, et al., 2020; Turnbull et al., 2021). E-learning and distance learning are not new to education systems; however, they have gained plenty of attention after the COVID-19 pandemic has forced many communities to lockdowns (Qazi et al., 2021). Many schools and higher education institutes were forced to switch to online teaching globally in an effort to fight back the spread of the virus. As a result, many online platforms were adopted to deliver educational contents to different fields and sciences (Alkhalil et al., 2021).

However, with many free and commercial online platforms out there, the question remains: which of those platforms provides the optimal user experience? The optimal experience can be defined in the form of practicality, or ease of use for example. Or it can be defined in the form of fluency and minimal bugs. This question can *only* be answered from the users' point of view. In this case, students and teachers normally represent the largest section of educational online platforms users. Students, on one side, perceive the leaning process by achieving the offered activities like quizzes, assignments, and tests online. Therefore, they prefer user-friendly interface and a satisfying experience (Abdullah et al., 2021; Derbas et al., 2023). On the other hand, teachers and lecturers look for platforms that provide little technical problems and smart user interface (Jaber et al., 2021).

However, we can safely assume that students are considered the number one user for such platforms, especially when it comes to using learning management systems (LMS) as online educational portals. Therefore, getting students' feedback on LMS's can be a good tool to improve the quality of the portals which, in turn, may help improve the students' performance and productivity in their courses. The most common way to collect feedback is by performing online surveys. There are many survey templates out there that may or may not serve the purpose of such studies. However, certain surveys were designed to measure the usability of websites and online applications. The most common of which are: system usability scale (SUS) and technology acceptance model (TAM). Admittedly, the latter has been usually used to study factors that influence users' intention to use a certain product (Aburbeian et al., 2022). In this case, LMS is also considered an online product that students use. SUS is essentially a questionnaire that was developed in 1986 and still is widely used today (Vlachogianni & Tselios, 2022). TAM is also a questionnaire model that was developed in 1989 and the main purpose of it was to emphasize the idea that users do not use products based on the features but rather on their experience with the product (Oyman et al., 2022). These two survey models can be used to evaluate the readiness and usability of educational platforms and LMS.

Although many research studies have proposed comparisons between different educational platforms, there is still very little research covering the aspect of system usability of LMS using subjective industry-standard measuring scales. In this study, we launch an investigation on one of the most commonly used educational online platforms on the market; Moodle (Manasrah et al., 2023). The purpose of this study is to show how well Moodle is perceived by students, and whether their experience actually improved their academic performance. We hypothesize that students who perceive the usefulness of the LMS will have a positive behavioral attitude towards it which in turn affects their academic performance. To do so, SUS and TAM are used as reliable measures of the usability of Moodle. The study will help us explore the advantages and disadvantages of Moodle using the students' point of view. The study will also give insightful information about Moodle as an LMS in terms of interaction and user experience.

Background

E-learning and distance learning have proved to be the most optimal teaching approaches since 2019. Of course, the rise of these teaching techniques was supported by the continuous improvement of online teaching platforms like Microsoft Teams, Moodle, Canvas, and many others. Therefore, those platforms have been the subject of many research studies that investigated the platforms' capabilities to provide better interaction for students. For instance, a previous study investigated the effect of preparing test questions using Moodle platform on the teachers' overall performance in developing test questions (Sastrawijaya et al., 2019). The results showed that there was a strong correlation between them. A more recent study showed that Microsoft Teams' usability scale is strongly correlated with the technology acceptance model (Pal &Vanijja, 2020). It also suggested that usability of the platform is not the only decisive factor of the user experience. These results agree with previous findings where it was shown that the quality of information in e-learning affects students' satisfaction and perceived learning outcomes (Perez et al., 2020; García-Murillo et al., 2020).

There have been, however, other studies that investigated the usability of e-learning platforms from the teachers' point of view. One study investigated teachers' perceptions of using Moodle's activities toolbox (Badia et al., 2019). The results showed that Moodle can provide new educational scenarios which impacts the perceived learning. Another research also showed that Moodle efficiently supports teaching and assessment evaluation but did not show any significant effect on the interaction between teachers and students (Saw et.al, 2019). This shows that e-learning platforms can have advantages and disadvantages from teachers' perspectives (Manasrah et.al., 2021). A similar study discussed this point and showed that the main demotivating features from those platforms were: the additional workload, technical problems, plagiarism, and many others (Aikina & Bolsunovskaya, 2020). This aspect, particularly, led to another line of research where comparisons between

platforms have been conducted like in (Krašna & Pesek, 2020; Khaster, & Khaster, 2022). However, assessing a certain LMS from students' point of view needs should be focused on usability, readiness, and user experience. In other words, SUS and TAM surveys should be conducted. One of the studies showed that the quality and self-efficacy of the system affected the perceived usefulness (Fearnley & Amora, 2020). Another study also conducted an SUS survey on the using e-learning tools (Chu et al., 2020). The study had an 80% SUS score which is a positive indication of perceived usability.

The study presented here focuses on evaluating the readiness and usability of an e-learning portal (in this case, Moodle) from students' point of view. SUS and TAM surveys will be used to assess our hypothesis. This study is somewhat different from pervious ones since the main factor here is how LMS can influence students' academic performance based on their perception of it.

Method

In this section, the methodology of the surveys and the procedure are described. Two hundred students participated in the surveys, all of them from the college of engineering from the civil, electrical, mechanical, and alternative energy departments. The surveys were conducted online through Al Zaytoonah University of Jordan's (ZUJ) e-portal during the academic year 2021-2022.

SUS and TAM

System Usability Scale (SUS) is a survey model that was developed in 1986 by Johan Brooke (Brooke, 1996). The survey aimed to assess the usability of online websites and apps through a series of 10 statements. A five-point Likert scale is often used to answer these statements, ranging from "strongly agree" which takes five points (the highest score) all the way to "strongly disagree" which takes one point on the scale (the lowest score). The scale focuses on the on the usability of an online system from the user's point of view in order to compare it with other similar systems. The scale spits out a figure number that is between 0 and 100 which can be considered a benchmark of the system's usability. The higher the number, the better the score and the opposite is true. Table 1 shows the ten SUS statements that were used in this survey.

Table 1. System Usability Scale questionnaire.

Number	Statement
1	I think that I would like to use this system frequently.
2	I found the system unnecessarily complex.
3	I thought the system was easy to use.
4	I think that I would need the support of a technical person to be able to use this system.
5	I found the various functions in this system were well integrated.
6	I thought there was too much inconsistency in this system.
7	I would imagine that most people would learn to use this system very quickly.
8	I found the system very cumbersome to use.
9	I felt very confident using the system.
10	I needed to learn a lot of things before I could get going with this system.

The survey is structured in a way were the positive statements are presented in odd numbers and the negative statements are presented in even numbers. The students answer to each of these statments in the Likert scale, and then each one of the answers is given a score from 1 to 5 as mentioned earlier.The first step to calculte the SUS score is to collect the answers from all odd-numbered statements and substract 1 from each one of the asnwers (X-1). For example, if a student responded to statement 5 for instance with "agree" (i.e., score = 4 points), the score becomes 3 and so on and so forth.

$$SUS\ score = \left(\sum_{x=odd}^{10} (x-1) + \sum_{x=even}^{10} (5-x) \right) * 2.5$$

The second setp is to collect the answers from all even-numbered statements and then substract the answer score from 5 (5-X). This way, if a student asnwered "strongly disagree" to statement 10 for eample (i.e., score = 1), the score becomes 4. Then all the adjusted scores for each user are then added together and then multiplied by 2.5. Equation 1 summarizes the calculation process for each user. A score of 80 and above is considered

"excellent", whereas a score between 68 and 79 is "good". A score between 51 and 67 is "average" and a score below 51 is "poor".

The Technology Acceptance Model (TAM) is a survey model developed by Fred Davis in 1989 (Granić, and Marangunić, 2019). This model focuses on the users' perception and experience with the platform more than it focuses on its features and tools. In other words, the intention to use the platform depends largely on the students' attitude towards using it. This attitude is heavily influenced by the "perceived ease of use" and "perceived usefulness". However, the latter has a larger influence. The two terms are also affected by some external variables like word of mouth, friends and colleagues, and previous experiences. Figure 1 shows the full scheme of the TAM:

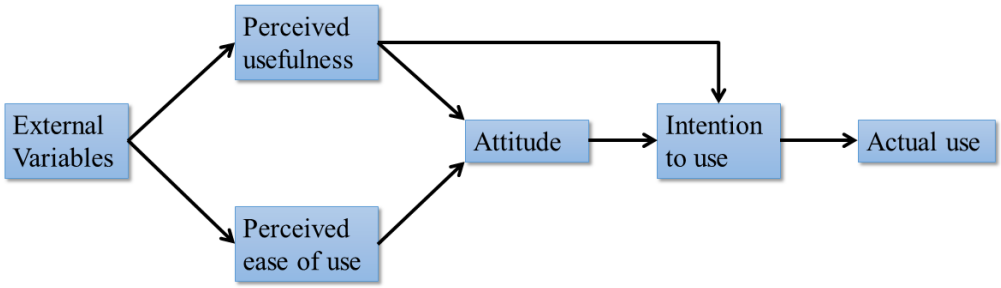

Figure 1. The scheme of technology acceptance model TAM (Bailey et al., 2022).

There are six survey statements for the perceived usefulness and perceived ease of use. Table 2 shows the statements that were used in this study.

Table 2.Technology Acceptance Model questionnaire.

Number	Perceived usefulness	Perceived ease of use
1	Using the LMS helps me complete tasks faster.	Learning how to handle the LMS would be easy for me.
2	Using LMS improves my HW performance.	I would find it easy to let the LMS do what I want it to.
3	Using LMS increases my productivity.	My interaction with the LMS would be clear and smooth.
4	Using increases my effectiveness at work.	I would find the lMS flexible to work with.
5	Using LMS makes it easier to do my job.	It would be easy for me to become agile with the LMS.
6	I would find this LMS useful at school.	I would find it easy to use.

Procedure and Participants

The surveys were conducted online originally to use them as an indirect assessment of the e-learning system at Al Zatytoonah University of Jordan (ZUJ). The results of the surveys would then be utilized in ABET self-study reports. The surveys would be announced to students in electronic formats across the e-learning portal and all social platforms. There was no time window for when students should fill in the surveys. Students from all engineering backgrounds at the ZUJ participated in this survey. Figure 2 shows the majors of the participants.

Results

The results of the system usability scale SUS showed an overall score for each student, based on the equation (1). An SUS score of 80 and above is considered "excellent" for the usability of the LMS, while a score between 68 and 79 is considered "good". A score between 51 and 67 is considered "average" and a score below 50 is considered "poor". Figure 3 shows the number of students in each category. The general results of the SUS survey showed that about 60% of students expressed an "average" usability experience with the LMS and about 27% expressed an experience between excellent and good. However, 12% of students experienced a "poor" encounter with the LMS. This is an indication of usability where the LMS basically does the job, but not quite. It is an understandable result given that university students were the main "users" here.

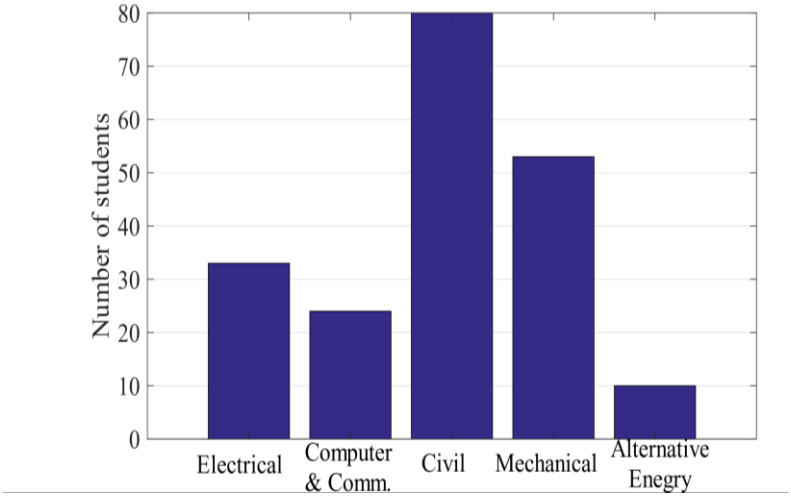

Figure 2. Majors of the participants.

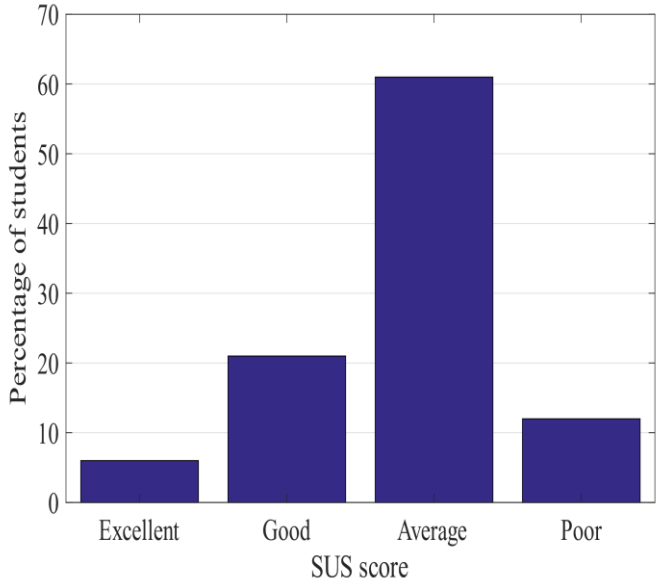

Figure 3. Sum of SUS scores for students.

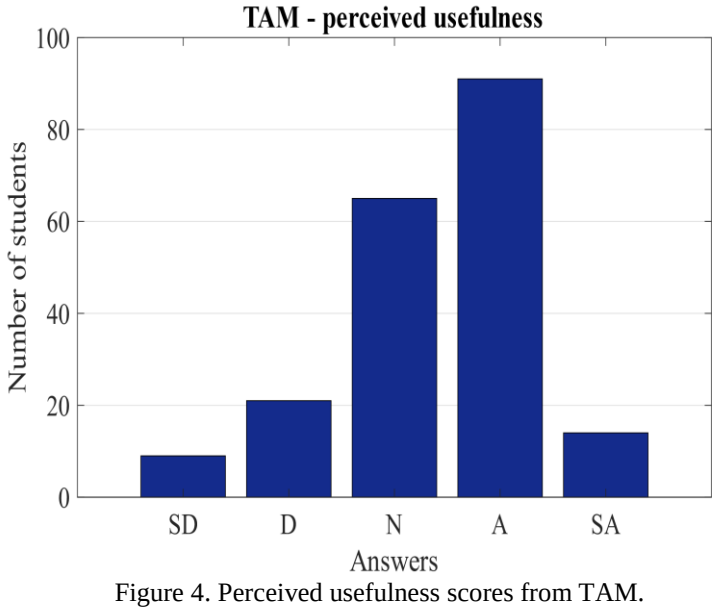

Figure 4. Perceived usefulness scores from TAM.

To get more insight into these results, the technology acceptance model TAM results are illustrated in Figures 4 and 5. As shown in Figure 1, users' attitude is influenced by the perceived usefulness and perceived ease of use of the LMS. These two factors are presented in TAM in Table 2. Figure 4 shows the perceived usefulness results of TAM where more than 50% of students agreed or strongly agreed with the statements of perceived usefulness whereas only 15% disagreed with them. However, the results of the perceived ease of use, shown in Figure 5, were generally neutral with the statements with a notable disagreement. Both of the results complement the SUS "average" scores. Students agreed with the usefulness of the LMS but not with its ease of use. In other words, students' experience on usefulness and ease of use defined a "user attitude" towards the LMS, which in turn resulted in a 60% "average" usability in SUS.

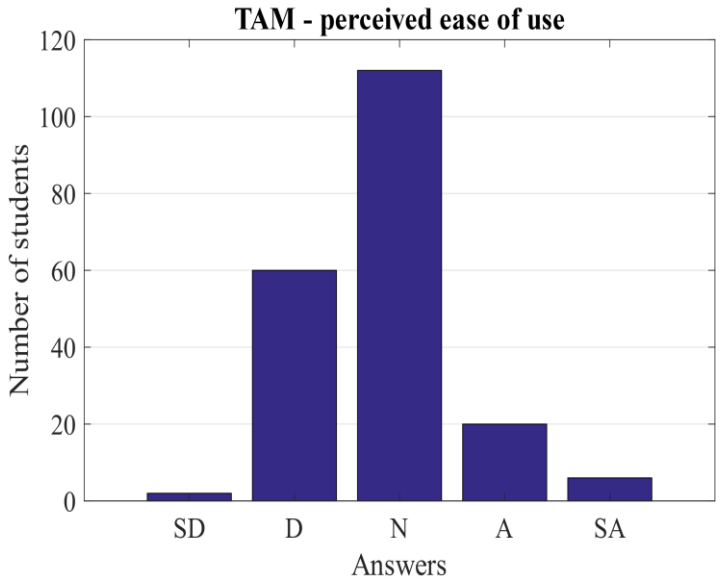

Figure 5. Perceived ease of use scores from TAM.

Though diving deeper into TAM results, shows that students mostly agreed that the LMS would increase their productivity and improve their academic performance. Figure 6 illustrates these results where more than 50% of students agreed or strongly agreed with statements 2 and 3 from TAM's perceived usefulness. This is also an indicator of a good practical experience on the usefulness of the LMS, but not on the quality of the experience.

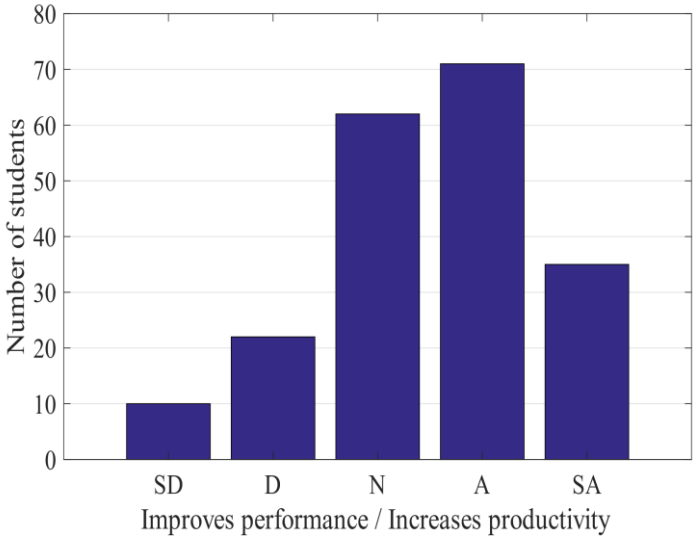

Figure 6. Sum of answers from statements 2 and 3 (perceived usefulness).

To prove these results statistically and to test our hypothesis, multiple-way ANOVA's were conducted on the results. A Chi-square goodness-of-fit test was conducted on the data and showed that the sample had a normal distribution which allowed the use of the analysis of variance. The first ANOVA was conducted with a dependent variable of "perceived ease of use" and two independent variables of "agreeing to SUS negative

statements" and "agreeing to SUS positive statements". When the data showed statistical significance, a Tukey honest significant difference (HSD) for a post-hoc test with a 5% alpha value. The results did not show significant statistical differences between the agreement with TAM's perceived ease of use and the agreement with SUS positive and negative statements. Figure 7 shows the means and confidence intervals of the tested groups.

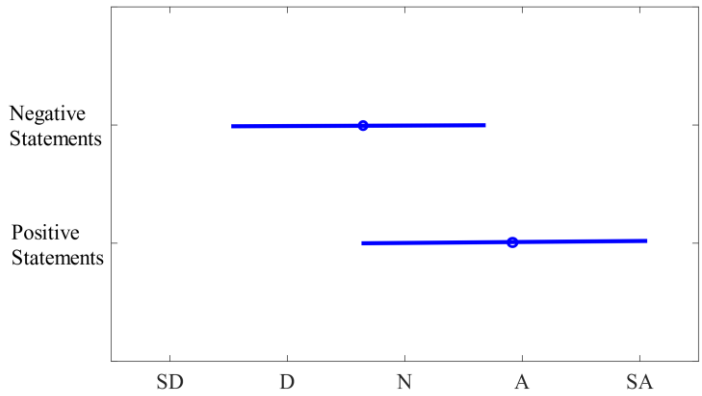

Figure 7. Means and confidence intervals between agreeing with positive/negative statements of SUS and perceived ease of use.

The second ANOVA was conducted with a dependent variable of "perceived usefulness" and the same two independent variables. The results showed that students who generally "agreed" with the positive statements of the SUS were statistically significantly more in agreement with perceived usefulness of the LMS as shown in Figure 8. This result shows that students who have a positive experience with the LMS statistically will find it useful when they work with it. This goes to show that students can indeed develop an "attitude" towards using the system which influences the actual use of the LMS, as illustrated in Figure 1.

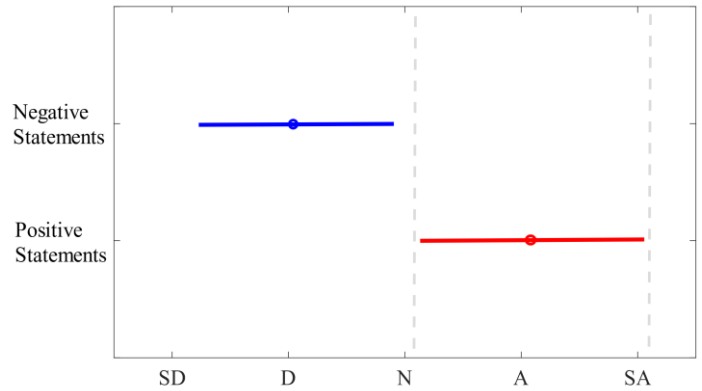

Figure 8. Means and confidence intervals between agreeing with positive/negative statements of SUS and perceived usefulness.

Conclusion

This study investigated the usability and perceived experience of a learning management system (LMS) at Al Zaytoonah University of Jordan from students' point of view. Two survey models were used in the investigation: the system usability scale SUS and the technology acceptance model TAM. The hypothesis was that students who perceive the usefulness of the LMS will have a positive behavioral attitude towards it which in turn affects their academic performance. The investigation was carried out through online surveys with a 200-student sample. The results showed that 60% of students expressed an "average" usability experience with the LMS and 27% of students expressed a "good" and "excellent" experience. The results also showed that more than 50% of students agreed or strongly agreed with the statements of perceived usefulness, however, they were generally neutral with the ease-of-use statements. The statistical results showed that students who had a positive experience with the LMS were statistically significantly more in agreement with its usefulness. This indicated that students attitude towards the LMS affected their actual use of the LMS.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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Youth Socio-Cultural Literacy towards Implementing Culture Preservation of Karangbesuki Temple

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Abstract: Socio-cultural background as a factor in social life can provide direction for how the community preserves local culture. The lack of knowledge about the existence of the Karangbesuki Temple site can be a sign that the socio-cultural literacy of the temple is still poor. Based on the conditions above, the priority of this research is to find out how the socio-cultural literacy of youth is related to the digital preservation of Karangbesuki Temple culture. This qualitative study used a phenomenological approach with five young people in the Karangbesuki area as informants. The characteristics of the management of Karangbesuki Temple still use the concept of self-help, so it does require community involvement, especially local communities. Karangbesuki youth, as members of the community, can help promote the site and learn to carry on oral traditions and justify history for the cultural preservation of Karangbesuki Temple. Impressive research findings show that the socio-cultural literacy of youth in the Karangbesuki area has made youth willing to carry out cultural preservation at Karangbesuki Temple. Youth also do not hesitate to make the history of Karangbesuki Temple their identity or attribute. Karangbesuki youth can be said to have been quite good at socio-cultural literacy which implements the culture preservation of Karangbesuki Temple. Youth have high knowledge about how they can play a role and act as successors to local culture. One proof of the results of this knowledge is the creation of a promotional video for the temple and the participation of youth in cultural activities and discussions. PPBI, as a facilitator of cultural knowledge of Karangbesuki Temple, also works with youth to be better at preserving the culture of the Karangbesuki Temple site.

Keywords: Sociocultural literacy, Culture preservation, Temple

Introduction

Temples play an important role in the cultural history of the Southeast Asian region, including Indonesia (Herbig et al., 2019). Temples are a cultural heritage of a nation which is a manifestation of Hindu and Buddhist architecture. From a socio-cultural perspective, temples become a form of religious monument for society Indonesia because it represents syncretism which shows the typical Indonesian way of life in society since time immemorial (Fadli et al., 2019). Behind the beauty of the embodiment of the ecosystem of past society, which is reflected in the temple, there is a long lapse of time between the life when the temple was used until the current era, namely society. 5.0 presents challenges in the form of discontinuing or even distorting the historical story culture of the temple site. For example, the results of initiation interviews with cultural actors at the Karangbesuki Temple site, Malang city show that there is some knowledge of the meaning of temple preservation that is different from the folklore circulating in the community of Karangbesuki subdistrict, Sukun, Malang city. Temples are considered magically charged locations that are only used to practice *pesugihan* or other means of committing evil.

The shift in cultural meaning of temple sites such as the example above has become one of the common focuses of study carried out by observers of history. For example, research by Astuti et al. (2022) which examines the best approach to preserving Batujaya Temple, Karawang district amidst public indifference towards the site. It research found that the best way to stimulate community efforts to protect temple sites is through preserving the historical environment and preserving the local culture of the community. Preservation of local culture is carried out through exploring oral traditions and temple history to provide a more comprehensive view of the cultural background of the temple's construction. The clearly visible impact of this effort is a sense of pride and ownership of the temple site as the cultural identity of the local community (Purwiyastuti, 2019).

As part of society, youth are considered the next generation who are progressive and provide hope for the continuity of culture in society. Research by Rusmana et al (2017) regarding the socio-cultural literacy of forest buffer communities regarding the preservation of the Gunung Gede Halimun Salak National Park (TGHS) provides an indication that young people can maintain the culture of preserving a locus that the local community wants to preserve. This research positions youth in the Karangbesuki sub-district area as the best candidates for preserving the cultural wisdom of Karangbesuki temple, this can be known through efforts to create promotional video content via YouTube and Instagram. Behind the success of making promotional videos, the problem found was that youth participation in exploring temple cultural knowledge was still limited and information was still mostly focused on cultural actors. The initial study in this research also showed that quite a lot (65.73%) of Karangbesuki youth were unaware of the existence of the Karangbesuki Temple site. This is quite regrettable considering that young people are a generation that is very technologically literate so they can contribute to cultural preservation digitally. Cultural content from temple sites that are thousands of years old can be preserved through digital preservation efforts (Spires, 2019).

Socio-cultural background as a factor in social life can provide direction for how society preserves local culture. The lack of knowledge regarding the existence of the Karangbesuki Temple site could be a sign that socio-cultural literacy regarding temples is still lousy. Based on the conditions above, the priority in this research is knowing what is the socio-cultural literacy of youth regarding the digital preservation of Karangbesuki Temple culture.

Method

The method used in this research is qualitative with a phenomenological approach. In this research, the research targets were youth from Karangbesuki, Malang City. The youth in question are people aged teenagers to late adulthood as people who are still productive. The data collection techniques were carried out by conducting interviews with key informants directly, observation, and also literature studies carried out in May until July 2023. Determination of the sample in this research was carried out using purposive sampling technique (Creswell, 2017). The indicators determined in this research include: (1) is a youth in the Karangbesuki Village area, Malang City; (2) Have visit and find out about the Karangbesuki Temple site, and (3) be willing to be interviewed. A total of 5 key informants were successfully obtained in this research.

Data analysis was carried out using the interactive model from Miles, Huberman in Sugiyono (2018) which includes three stages, including: (1) data reduction, (2) presenting data, and (3) drawing conclusions. Furthermore, data source triangulation was carried out in the validation process to ensure the validity of the research data.

Results and Discussion

Karangbesuki Temple Management Characteristics

Karangbesuki Temple is located at *RW* (Small regional society) 06, Karangbesuki Village, Sukun District, Malang City. This temple is one of the remains of the Kanjuruhan Kingdom which was built in the 8th century AD. The Karangbesuki Temple site became known in the 1900s as shown in a book by N.J Krom. In the book, Karangbesuki Temple is called Basuki Temple. At the beginning of the site's discovery, the condition of the temple was in ruins with a *batur* (a pile of stones) as high as 1.5 meters above ground level. In terms of management, Karangbesuki Temple does not have a special organization that manages the site. The management of the temple is carried out independently by cultural observers such as local cultural figures, and organizations such as the Indonesian Archaeological and Cultural Conservation Center (PPBI). Land assets are owned by the government so that land ownership does not belong to individuals. Self-help management on the

site includes creating seating areas, maintaining cleanliness, as well as providing cultural activities aimed at expressing gratitude and gratitude to the ancestors because the knowledge of *kaluhuran* or kindness has been passed on to the younger generation.

In managing the temple, the local community's support for preserving the temple began to become increasingly visible after the inauguration of Karangbesuki Temple as a tourist destination in the Karangbesuki sub-district area in 2020. One example is the making of a tourism promotional video initiated by the Public Information Group (KIM) in Karangbesuki Sub-district. The promotional video making project involved young people from Karangbesuki sub-district to become actors, videographers, editors, and so on for the sake of publishing the temple's promotional video content.

Characteristics and Performance of Karangbesuki Youth in Karangbesuki Temple Cultural Preservation Activities

Karangbesuki youth are generally members of the Karang Taruna (Youth council organization). Apart from that, there are other social organizations that have a youth demographic such as KIM and also the Tourism Awareness Group (POKDARWIS). Cultural preservation activities that have been carried out by youth include;

Making Promotional Videos for Temple Tourism

The concept of making this video was purely the idea of the Karangbesuki youth, the purpose of making the promotional video was because of the youth's concerns about the ignorance of the local community regarding the existence of Karangbesuki Temple. This is recognized as happening because there are other more popular temple sites such as Badut Temple which is located about 600 meters from the Karangbesuki Temple site. The video was then uploaded to KIM Karangbesuki's YouTube and Instagram and the video link was distributed via the WhatsApp application to 56 RTs in 10 RWs of Karangbesuki Subdistrict.

Participation in Cultural Activities on Special Days such as the Full Moon, Friday Night, etc.

Youth took part in cultural activities organized by PPBI at the Karangbesuki Temple site. The location of the temple is quite large and can accommodate informal meetings in an effort to explore stories, history and oral traditions from the formation to the meaning of Karangbesuki Temple. Based on information from PPBI cultural activists, it is known that public interest, especially youth, is quite good when participating in cultural activities. One of the cultural teachings included in the cultural activities at the Karangbesuki Temple site is nembang macapat in the form of thanksgiving poems in Javanese and also several Javanese Kawi languages. and Sanskrit. In this activity, young people get the opportunity to directly experience cultural activities that can be implemented.

Socio-Cultural Literacy of Karangbesuki Youth towards the Cultural Preservation of Karangbesuki Temple

The characteristics of the youth community in Karangbesuki are classified as heterogeneous considering that the location of Karangbesuki Village is the central area of the city. From a socio-cultural perspective, it is known that historically, Karangbesuki youth came from families who were born and raised when Karangbesuki was still a rural area and there were also quite a lot of youth who moved from other cities or districts and then settled in Karangbesuki. It is these diverse socio-cultural characteristics of young people that provide different views on how to carry out cultural preservation at the Karangbesuki Temple site.

There are young people who have the idea that temples are state assets so that the government is responsible for preserving the site. However, he also supports the role of the community in contributing to the transmission of oral traditions and actual history regarding temples. This was expressed by BK (19):

"I like history and fairy tales, especially in my own area. I was quite amazed to know the meaning of my village. "I don't hesitate to tell friends and other people about the nobility of the ancestors who gave us the heritage of Karangbesuki temple" (Interview on June 17 2023)

The enthusiasm of young people in efforts to preserve culture is considered to be a benefit for the young person because it can provide a new social identity for a young person. For example, several informants did not hesitate to call themselves arek karbes or could be interpreted as Karangbesuki people. The ability to know the history and oral traditions of the temple, combined with regional pride, is proof of the awareness of cultural preservation by young people in Karangbesuki regarding Karangbesuki Temple.

Discussion

The research findings impressively show that the socio-cultural literacy of youth in the Karangbesuki area has made youth willing to preserve the culture of Karangbesuki Temple. Youth also do not hesitate to use the history of Karangbesuki Temple as their identity or personal attribute. This is in accordance with the aim of preserving cultural heritage in Article 3, CHAPTER II, Law Number 11 of 2010 concerning Cultural Heritage which states that the aim of cultural preservation is to preserve the nation's cultural heritage and the heritage of mankind, increasing the honor and dignity of the nation through cultural heritage, strengthening the nation's personality, improving people's welfare, and promoting cultural heritage to the international community. This kind of pride is a sign of a society's socio-cultural literacy towards a phenomenon, in this context a cultural heritage site is said to be successful (Collin, 2019). Karangbesuki youth are trying to take a role through efforts to preserve history and oral traditions through digital media which are called more contemporary or slang. Even though there is still a lot of potential for other cultural preservation efforts, Karangebesuki youth already have the fighting power and curiosity to document history and oral traditions so that they are not misunderstood in society. One sign of a society that is easy to transfer knowledge is when they have high curiosity, which opens up discussion space to increase information production (Priatna, 2017). This is also the key to successful preservation of local culture. Karangbesuki youth use the oral traditions of Karangbesuki Temple as their identity, this shows that the culture reflected in oral traditions is still relevant and useful for society and the younger generation.

Conclusion

Karangbesuki youth can be said to be quite good at socio-cultural literacy which implements the preservation of the cultural wisdom of Karangbesuki Temple. Youth have a high level of knowledge regarding how they can play a role and act as successors of local culture. One proof of the results of this knowledge is the creation of temple promotional videos and the participation of youth in cultural activities and discussions. PPBI as a facilitator of cultural knowledge at Karangbesuki Temple also works with youth to better preserve the culture of the Karangbesuki Temple site.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Acknowledgements or Notes

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Contemporary Education Systems: The Case of United States

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Abstract: Modernization efforts for the development of education systems were carried out in parallel with the needs of the age. In this direction, societies that have taken the step of modernization have first tried to revise their existing education systems and identify the prominent obstacles. Education systems have followed a very different course in history; It has been affected by many historical, geographical, economic, social, and cultural factors. The United States education system is an education system that is managed locally due to the history and structure of the country, where the education program, academic calendar, programs, school system structuring, and teacher appointments are determined by the states. In this study, first the political and cultural history of the country and then the functioning and structure of the education system are discussed. The study also compared the Turkish education system and US education. Finally, the study was concluded by including the problems encountered in the US education system.

Keywords: Contemporary education, Education systems, Educational program,

Introduction

The American continent, also known as the New World, was in the past considered a single continent extending from the North Pole to Cape Horn (Gumus, 2004). The United States of America (USA) is a 50-state country with a vast area of 9,628,382 square kilometers and a population of 302,503,635 people. The USA, which had its first written constitution on September 17, 1787, is a federal republic based on pluralist democracy and governed by a presidential system (Harmancı, 2011). The Spaniards were the first to establish colonies in the area where the territory of the United States today is spread. The Spanish colonized Florida, Texas, and California in the 16th century. In this century St. Laurent region and Louisiana in the south came under French rule. In the mid-18th century, the entire coastline from Newfoundland to Florida and the western slopes of the Appalachians belonged to the British, the interior from Labrador to the coast of the Gulf of Mexico belonged to the French, and all the lands west of the Mississippi belonged to the Spanish. It was under the rule of. The Russians also captured Alaska and advanced close to San Francisco (Ferro, 2011).

The largest ethnic group among the first settlers of the United States was the British. Thus, the dominant language in the country became English (Drabelle, 1997). The victory of England in the Seven Years' War, which ended in 1763, paradoxically pulled the mechanism of the American Independence movement, and the introduction of new and heavy taxes for the budget that was deteriorated in these wars mobilized the colonies. (Bryce, 1962; Ferro, 2011). The 13 British colonies, which declared their independence on July 4, 1776, were successful in their struggle and established the United States of America in 1787 (Selen, Undated). The first US President is George Washington. George Washington was a Virginia farmer who fought against the French in the Seven Years' War as an officer of the local troops (Luraghi, 1975). In 1798, Congress, held under the leadership of the US president, passed the Naturalization Act, which made it difficult to become a US citizen. The Law on Foreign and Insurgent Movements, which was adopted in the same year, made it difficult for French and Irish immigrants to become naturalized against a possible war with France, and brought some restrictions to the print media (Mashlaw, 2007).

The period 1789-1861 was a period of compromises that resulted in the Civil War. Although the problem that confronted the Northern states and the Southern states during this period seemed to be slavery, the main conflict problem actually arose from the developments in resource distribution (Mashlaw, 2007). A few years after the end of the Civil War, the United States became a leading power in industry, and skilled businessmen became wealthy (Drabelle, 1997). The development of industry in the country, reaching ever greater dimensions, required an unprecedented concentration of transportation and communication. The supply of raw materials from distant places and the sale of manufactured goods in distant markets led to significant developments in road and canal construction in many parts of the USA, and the Panama Canal zone was established in 1903. (McNeill, 1989).

While Americans were embarking on dangerous adventures abroad, they were also bringing new perspectives to social problems within the country. Despite the appearance of prosperity in the country, half of the industrial workers still lived in poverty. New York, Boston, Chicago, and San Francisco; while they were proud of their museums, universities, and public libraries, they were ashamed of their slums. At that time, the "laissez faire" principle was dominant, and the government was wanted to intervene in trade as little as possible. In 1900, the 'Progressive Movement' began. The aim of this movement was to reform individuals and society through the government. The supporters of the movement were economists, sociologists, engineers, and bureaucrats who sought scientific, cheap, and effective solutions to political problems (Drabelle, 1997).

The USA also entered the 1st and 2nd World Wars and played a major role in winning these wars with its great economic and military power (Ferro, 2011). In the late 1950s and early 1960s, African Americans initiated non-violent demonstrations and boycott actions, under the leadership of Dr. Martin Luther King, to end racial discrimination and be equal before the law. These actions culminated on August 28, 1963, when more than 200,000 people of all races gathered in front of the Lincoln Memorial in Washington, D.C. Shortly after this date, the United States Congress passed laws that gave blacks the right to vote, prohibited discrimination in employment, and provided equal access to education and community services (Drabelle,1997).

The USA is a country with a lot of ethnic diversity, as it is the product of a structure founded and shaped by immigrants from many countries. As a result of immigration, a new synthetic ethnic structure, a new nation, began to rise in America. In the past, the integration of immigrants, who created America and are America itself, into American society was perceived as a sign of goodwill that would prove their belonging to this country (Glazer, 2004). The globalization process, which started in the 1500s, expanded to include the American continent in the second half of the 18th century. After the North and South continents, as well as the whole America, were opened to settlement starting from the 15th century, European people brought European culture to the country and settled it (Sander, 2003). At the beginning of the twentieth century, President Theodore Roosevelt, while defending those immigrants are the most important power of American society, defended the idea that immigrants should express their loyalty to America and should not prioritize their ties with their former countries of origin over their ties with America (Glazer, 2004).

The USA has a heterogeneous culture that has come to the fore in today's world (Taş, 2002). Cultural transfer is also very important in the US education system. In transferring cultural elements to the educational process, the US education system; its aims are to help students understand that culture has an impact on human behavior, to make them aware of common behaviors shown in common situations in the target culture, and to help students objectively evaluate generalizations about the target culture (Tomalin & Stempleski, 1993). The applied education curriculum is considered important for the harmony of ethnic groups in terms of bringing a common identity awareness and emphasizing a common history.

Education System

Each country creates an education system suitable for its own political, economic, social, and cultural structure. In the United States, education is largely the responsibility of states and local school districts. It is not possible to talk about a formal function of the federal government in education (Erdoğan, 1997). Ornstein and Levine (2006) stated that there are 50 different state education systems in the USA and that there are many differences between the local school systems in these states. In this regard, determining the US education goals; federal, state, and local politicians, as well as special interest groups, community organizations, and professional educational organizations (Spring, 2010).

In 1989, in Charlottesville, Virginia, President George Bush and 50 state governors held an Education Summit to set national goals for US primary and secondary schools to implement a general reform package that would

give new impetus to American education (Drabelle, 1997). The goals determined at the summit are as follows (Fiske & O'Grady, 2000):

- All children will start school ready to learn.
- High school completion rate will be increased to at least 90%.
- Student achievement will be increased and all schools in America will be taught to use their minds to become responsible citizens and actively participate in the economic life of the nation.
- Teachers will develop their professional knowledge and skills to prepare American students for the next century.
- American students will be at the top of the world, especially in mathematics and science.
- Every adult American will be literate, have the knowledge and skills to compete with the global economy, and fulfill the rights and responsibilities of citizenship.
- There will be no room for alcohol, drugs, and violence in any American school. Schools will provide students with safe and disciplined learning environments.
- Parents will be more involved in the education and training process in all schools.

Although none of these goals, which were accepted at the summit and expected to be achieved by 2000, were fully realized in 2000, the decisions taken in terms of creating a common understanding of the determined goals deeply affected the US education system (Fiske & O'Grady, 2000).

In the early days of the USA, free public schools were opened with the money obtained from taxes and the states were made responsible for their own education systems (Demirel, 2000). Considering the financial resources of education in the USA, the weight of the states is better understood. For example, 90% of the $852 billion spent on education nationwide in the 2003-2004 academic year was covered by state, local and private sources. Therefore, it can be said that the federal government's national education expenditures are at the level of 10%. Considering that part of this 10% budget comes from the programs implemented by the Ministry of Health and the Ministry of Agriculture for schools, the contribution of the US Department of Education to education is 6%. The US Department of Education's $63.3 billion budget is 2.7% of the federal government's $2.3 trillion 2004 fiscal year budget (US Department of Education, 2012).

Public schools, which basically benefit from state and state funds, are taught by at least one or two teachers, and are managed under a higher education institution, include classical, private, vocational/technical education. The majority of students who do not attend public schools attend paid private schools. Private schools, on the other hand, are schools that provide education within the same framework as public schools but belong to private enterprises. Four out of every five private schools in the United States were opened by religious groups. In the education program of these schools, religious education is also given in addition to academic courses (US Information Agency, 1997). Of the 55.8 million children estimated to have attended primary, secondary and high school in the 2007-2008 academic year, approximately 6 million, or 11%, were enrolled in private schools (USA Education of Brief, 2012). Although small in number, an increasing number of parents are choosing to educate their children at home. Students who receive education in this way can take the school leaving exams and receive a diploma (US Information Agency, 1997). A small number of Public Charter Schools and Bureau of Indian Affairs Schools, which are granted special rights and are neither public nor private schools, are also included in the US education system. For this reason, in order to meet the needs of different groups in education, practices such as multicultural education and multicultural programs have been implemented in the country (Erdoğan, 1997).

Each of America's 50 states has its own laws regulating education. While these laws may be similar from state to state, some laws may be completely different. For example, while all states require children to attend school, the compulsory education age varies from 16 in many states to 18 in some states. Therefore, all students in the USA receive education for at least 11 years, regardless of gender, race, color, religion, or physical disability. While some states distribute state funds themselves, playing a major role in the selection of books to be read and course materials to be used throughout the education process, some states leave the selection of books and the determination of the subjects to be taught to local school administrators. Although there is no general national education program throughout the USA, some basic subjects are taught in common. (Fiske & O'Grady, 2000).

Formal education: The USA enacted compulsory education law in all its states in 1918. Between 1920 and 1930, compulsory education laws were enacted in the majority of states. While 90% of children aged 7-13 in the country were enrolled in school in 1920, this rate reached 99% in 1980 (Cremin, 1988). Ültanır (2000) stated that the duration of compulsory education in the USA today varies between 10 and 13 years depending on the

states. Again, depending on the states, compulsory education starts at the age of 5, 6 or 7 and continues until the age of 16 (Table 1).

Table 1. Formal education stages in the USA (Education America)

School	Age	
Graduate Programs	22 and above	Postdoctoral programs PhD programs Master programs
College or University	21	Senior (Students who graduate with success in their 4th grade are entitled to a bachelor's degree)
	20	Junior (University 3rd year)
	19	Sophomore (Those who graduate from the 2nd year, or the 2nd year of college are entitled to receive an associate degree diploma)
	18	Freshmen (1st year or 1st year of college)
Secondary Education	17	Grade 12
	16	Grade 11
	15	Grade 10
	14	Grade 9
	13	Grade 8
	12	Grade 7
Primary Education	11	Grade 6
	10	Grade 5
	9	Grade 4
	8	Grade 3
	7	Grade 2
	6	Grade 1
Pre-school Education (Kindergarten)	4-5	Kindergarten

Primary education: The biggest goal of primary education in the US education system is the general intelligence and social development of children between the ages of 6-12 or 15. The system and lesson plans in public and private schools must be in harmony. In primary school, lessons are given to improve skills such as history, literacy, pronunciation, geography, mathematics, music, and painting. The most common school form is the 6-year primary school model (Elementary or Primary School). If a student who has studied for 6 years goes to high school without continuing secondary school, he/she will study for 6 years in high school. In secondary school, students mostly continue their education in English, science, social sciences, mathematics, and physics. In addition to these courses, there are elective courses such as career preparation, fine arts, and foreign languages. Students generally choose nearly half of the courses between 9th and 11th grades. In the 7th, 8th and 9th grades, students begin to plan their future and choose courses that can be useful to them in their future professional life. The duration of education in secondary school, with an enrollment rate of 99%, is 4, 3, 2 years (Demirel, 2000). In foreign language teaching, there are two types of programs implemented in primary schools in the USA. The first of these is FLES (Foreign language in the elementary school), and the second is FLEX (Foreing language experience programs). It covers all primary and secondary education foreign language programs of FLES (Jane, 1989).

Secondary education: In the USA, secondary education starts in the 7th, 8th or 10th grade, depending on the model applied in the region. The schooling rate is 94% (Demirel, 2000). The ratio of those who have completed secondary education in the United States to the relevant age population has also varied. While the ratio of secondary school graduates to the relevant age population in the United States was approximately 8% in 1900, this ratio increased to 80% in 1975 and in some states to over 90% (Bloom, 1998).

High schools: Secondary education generally consists of six years of primary education followed by three years of junior high and three years of upper secondary education (Senior High). Since education systems differ by state, there are also 6-year schools (Combined Junior-Senior High Schools) that combine both levels or 4-year high schools (4 Year High Schools) that provide education after 8 years of primary education. Students who attend high school and leave the intermediate classes can receive a high school diploma by attending evening schools or summer schools (Demirel, 2000). In addition, in the first semester of secondary education, vocational guidance is given importance to guide students in planning their future (Harmancı, 2011). In the USA, different

models are applied depending on the states. We can summarize the applied primary and secondary education models as follows (Education Department of The United States of America, 2012):

- 8+4 Model: Eight-year Elementary School or Primary School / Four-year High School.
- 4+4+4 Model: Four-year Elementary School or Primary School / Four-year Middle School / Four-year High School
- 6+6 Model: Six-year Elementary School or Primary School / Six-year Combined Junior and High School (Comprehensive High School)
- 6+3+3 Model: Six-year Elementary School or Primary School / Three-year Junior High School / Three-year Senior High School.

In some primary and secondary education institutions, students are divided into level groups within the classroom according to their abilities and knowledge levels. It is recorded that this practice, called "Streaming", was followed in 28% of primary schools and 34% of secondary schools as of 1973. However, in many states, especially Washington, this practice has been deemed discrimination by the court and banned (Erdogan, 1997).

Vocational and technical education: The duration of education in vocational and technical education is two years after high school and is paid. Credit application is essential in determining student success at the end of the year. The main purpose of vocational education is to increase the student's knowledge and skills in a particular job or professional field. In addition to the diploma, these students are also issued a professional qualification certificate (Bolay et al., 1996; Demirel, 2000; Ultanır, 2000).

Technical education is schooled at the post-secondary level. In order to have proficiency in technical education, it is necessary to continue 2-year higher education programs. After this associate degree education, the student can transfer to a 4-year higher education institution (Guclu & Bayrakcı, 2004).

No Child Left Behind (NCLB) Reform

The most sweeping change to the federal government's role in education since the Elementary and Secondary Schools Act of 1965 was the No Child Left Behind Act, passed by the Bush administration in 2001. The NCLB requires states to establish educational standards for different grade levels and take steps to improve the performance of those who do not meet these standards (USA Education of Brief, 2012). The NCLB reform aims to close the large achievement gap between states and schools within states and to provide equal educational opportunities to all children living in the USA (Guclu & Bayrakcı, 2004).

NCLB also envisions setting state targets for what students need to know in reading and mathematics as measured by standardized tests in grades 3 through 8. These and similar measures used for accountability on school performance are collected in report cards published annually throughout the state. Although state and local school systems have considerable flexibility to improve performance levels, this law calls for removing students from failing schools over time and cutting funding. Parents who have students in failing schools have the right to send their children to other public schools or schools with special status through horizontal transfer. Such students are also eligible for tutoring or other special services (USA Education of Brief, 2012). Jason Kamras, who was elected national teacher of the year in 2005, stated that the most positive aspect of NCLB was that it "institutionalized high expectations for every child in America"(USA Education of Brief, 2012).

Higher education: The growth in the service sector, along with developments in technology and business, has increased the need for employees who have completed their higher education in the USA (Krauss, 1976). Throughout history, American institutions of higher education have remained bastions of the privileged class, with predominantly white and male populations. This order did not change much until 1944, when the law known as G.I. (a term frequently used for American army soldiers fighting in World War II) was approved. Within the scope of the G.I. Bill of Rights, in addition to state aid to encourage vocational training and homeownership, there was also an article to provide state support for receiving education in almost all legally recognized higher education institutions (USA Education of Brief, 2012).

The autonomous character of the American education system is most evident at the higher education level. The reason for this is that American educational institutions (private) have surpassed public higher education institutions (Demirel, 2000). There are more than 3,600 institutions of higher education in the United States. More than 2100 of these are 4-year and more than 1500 are 2-year. Higher education institutions are administratively divided into two: private schools and public schools. There is no difference between public

universities and private universities in terms of education quality. In the USA, education is paid at both public and private universities. However, the fact that state universities benefit more from government support has made the tuition fees more economical (Education America, 2012).

The enrollment rate in higher education is 29%. Almost every state provides financial support to at least two public universities. Both private universities and public universities have three types of income sources: These are;

- Student fees,
- Donations and
- They are federal funds.

Higher education institutions select their own students. While selecting students, their scores and recommendation letters from general aptitude and achievement tests such as GRE (Graduate Record Examination) and GMAT (Graduate Management Admission Test) are taken into consideration. Apart from these documents, there are universities that organize a separate selection exam (Erdoğan, 1997). Students who have received a bachelor's degree, if they want to continue their education, continue their education for 1 or 2 more years and are entitled to receive a Master's Degree / Postgraduate Diploma. In addition, Graduate Diploma and Graduate Certificate programs are also certificate and diploma programs continued after university. Students who have a master's degree can continue their doctorate programs if they wish. Some universities and some departments directly accept students who have received a bachelor's degree into doctoral programs (Education America, 2012).

Teacher Training

Today, all states require a bachelor's degree or five years of university education, except for provisional certificates, in order to teach in the United States (Ornstein & Levine, 2006). Many states require teachers to earn a graduate degree such as a master's or doctorate within 10 years (Demirel, 2000). Anyone who wants to teach in American public schools must obtain a state certification in line with the grade level or major they choose, in addition to a college education. In previous periods, teaching certificates in the USA were given for life-long use. Today, some states limit the duration of teaching certifications to three to five years. Teachers who received indefinite certificates in previous periods were not affected by the latest application. (Ornstein & Levine, 2006).

There is no central control over teacher education in the United States. However, teacher education is influenced by different groups and organizations. The church is at the forefront of these institutions. 62% of universities and colleges are associated with the church. Although federal and state governments are not directly involved in teacher education, they are indirectly influential through guidance (Erdogan, 1997).

Requirements for obtaining teaching certification vary by state. This situation prevents teachers from relocating across the country. Many states operate alternative teacher certification programs in addition to traditional teacher certification programs. Today, 47 states and the District of Columbia offer alternative teaching certification programs. There are two main reasons why states offer alternative certification programs. The first is to attract more talented candidates educated in different fields to the teaching profession, and the second is to close the gap in teacher shortage areas such as science and mathematics. The most well-known alternative certification program implemented in the USA with a nationwide impact is the 'Teach for America' (TFA) program. Within the scope of this program, individuals who graduate with high success from various departments of universities other than teaching are selected and hired as teachers, and after undergoing an eight-week intensive training, they are placed in school districts with serious urban problems. (Ornstein & Levine, 2006).

Philosophy of Education

The education system and philosophy currently in force in the USA focuses on teaching students' methods of obtaining information independently and instilling research habits, instead of requiring students to stick to a single book within the framework of a strict curriculum and memorizing information based on the teacher's dictation. In addition, instead of specializing in only one subject at a young age, it is important to develop a broad and tolerant perspective, and to have a wide knowledge and cultural background by taking courses and

researching as many different subjects as possible. It is believed that an individual who has gone through a program suitable for this purpose will be able to evaluate events more healthily, adapt to changing conditions more easily, and find easier and more accurate solutions to problems that may arise. The number of courses given to students in an academic year in America is less than the number of courses given in Turkey. It is desired that students develop in all aspects and can spare time for extracurricular subjects. Students are encouraged to engage in activities such as sports, chess, music, painting, and scientific research. Very detailed information that requires expertise is given to students who are interested in that subject in additional courses. It is also thought that the details can be learned more easily through in-service courses, seminars, and on-the-job training in a short time after starting a job. When the aims of the US education system are examined, it is seen that the aim is to ensure the biological and emotional development of students. It is also aimed to ensure developments appropriate to various cultures arising from the demographic structure of the country (Şahin, 2009).

Comparison of US and Turkish Education Systems

Societies form their education systems in line with the values accepted in their societies. While the education systems of some societies have a centralized feature, the education systems of some societies have a feature based on local administration. For example, while the US education system is based on local government; Turkey's education system has a centralist feature (Table 2).

Table 2. Comparison of US and Turkish education systems (Harmancı, 2011)

United States Education System	Turkish Education System
The education system is local.	The education system is central.
There is no separate ministry of education at the centre. In the central government, the Department of Health, Education and Social Problems under the General Secretariat of the Presidency carries out educational affairs.	There are many general directorates in the ministry.
There is a state system.	There is a provincial system.
The State Board of Education and the State Director of Education are responsible for the educational affairs of the state.	He/she is the Provincial Director of National Education responsible for the educational affairs of the province.
School principals report to the local government.	School principals report to the central administration.
There is no central higher education institution, universities are autonomous.	The Council of Higher Education has concentrated all authority at the centre.
The school system structure (primary and secondary education) is in 4 different ways: 6+6, 6+3+3, 4+4+4 and 8+4.	The school system structure (primary and secondary education) is 4+4+4.
12 years of education is mandatory.	8 years of education is mandatory.
Programs and legal regulations are made in state assemblies.	Programs and legal regulations are made centrally.
The number of weekly lesson hours in primary education varies by state.	The number of lessons per week in primary education is 30.
The enrollment rate in primary education is 99%.	Schooling rate in primary education is 95.5% gross and 89.7% net.
The language of education is English. However, in classes or courses where most of the students' native language is not English, education can be provided in a foreign language until the students learn English at a sufficient level.	The language of education is Turkish.
Private schools are supported by the central government and local governments.	Private schools pay teachers themselves.
Temporary autonomous universities determine higher education on their own.	There is a central exam for transition to higher education.

The education systems of Turkiye and the USA compared have very different characteristics from each other. The education system implemented in Turkey has a centralized structure and is managed in accordance with this feature. This situation is also reflected in the education system. The US education system is largely based on the local government system. The education system is determined by the states. The central organization, on the

other hand, gets involved in providing financial support to state organizations and in the event of inextricable situations.

Problems Encountered in the US Education System

- The purpose of education needs to be defined in a way that reconciles the needs in terms of academic learning, social order, and vocational training.
- Both educators and students need to understand very well the power of education in developing society and raising awareness of democracy.
- Planning educational techniques for students who vary in terms of ability, social and economic level, vocational training, and aptitude has emerged as a problem for schools.
- Schools must meet the challenges posed by the rapid change in moral standards, especially among young people.
- Eliminating racial discrimination in public education has become a necessity.
- Due to the growing schools and the increasing number of students, the problem of meeting the need for books, buildings and other equipment has arisen.
- Financial support is needed for an education system that is growing and becoming more expensive every year.
- It is necessary to improve teacher education, improve teaching conditions and increase the attractiveness of the profession in order to attract more women and men with the necessary qualifications to the profession (Demirel, 2000).

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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Digital Learning Tools in Geography Education: A Systematic Literature Review

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Abstract: Digital learning tools not only enable the integration of technology in geography learning, but also bring a number of significant benefits to teaching methods and student understanding. However, it is difficult to find research that looks comprehensively and systematically at the use of digital learning tools in geography education. Therefore, this research aims to comprehensively examine the use of digital learning tools in Geography education. This research uses Systematic Literature Review (SLR) analysis which focuses on the types, impacts and obstacles in the use of digital learning tools in geography education. The data source in this research is the Scopus Database. This study analyzed13 articles from a total of 74 documents published in 2018–2023 which were screened by applying inclusion and exclusion criteria in three different rounds. This research shows that there are various types of digital learning tools used in geography education. In addition, the use of digital learning tools in geography education has had a positive impact. However, there were still a number of obstacles in implementing digital learning tools, such as limited technical resources, lack of additional training for teachers, as well as limited time, infrastructure and access, which need to be addressed immediately. The implication of these findings is the need to increase teacher training, improve educational technology infrastructure, and develop relevant curricula. In addition, the further research involving long-term evaluation and in-depth analysis of the impact of using digital learning tools will enrich understanding of the benefits of using technology in geography education.

Keywords: Digital learning tools, Geography education, Systematic literature review

Introduction

The rapidly developing digital era has brought significant changes. This can be characterized by the presence of digital technology which has changed many aspects of life, including the way of learning and teaching (Guillén-Gámez et al., 2023). In recent years, teaching tools have also changed due to developments in IT information technology (Choleva et al., 2022). These changes also provide new challenges and opportunities for the world of education (Farias-Gaytan et al., 2023). Learning is required to be more interactive, affordable and relevant to the demands of the times. The presence of technology in learning is expected to play a role in providing creative and innovative skills (Leavy et al., 2023). Therefore, learning outcomes and learning quality can be improved.

The presence of technology in education requires teachers to be able to adapt and adopt it to provide quality learning. Teachers need to align skills with the demands brought by technological advances in education (Camilleri & Calleja, 2023). The implementation of educational technology can be reflected in the use of digital learning tools. However, not all learning fields use digital learning tools optimally. Usually, this is due to various obstacles such as a lack of knowledge about the importance of digital learning tools in supporting

successful learning, limited knowledge in their application, and limitations in accessing, obtaining or using digital learning tool (Fergencs et al., 2020; Kibirige, 2023). In fact, the use of digital learning tools has great potential in improving the quality of learning (Cavalcanti et al., 2021).

In the context of geography education, the use of digital learning tools has become very important. One of the main challenges in geography education is how to describe and explain various geographical aspects which are often abstract or complex. This then emphasizes the importance of visual representation in geography learning, one of which can be obtained from digital learning tools. One study shows that the use of digital learning tools can create better understanding and stronger analysis (Lin et al., 2013).

Digital learning tools not only enable the integration of technology in geography learning, but also bring a number of significant benefits to teaching methods and student understanding. The utilization of these tools allows for more interactive geography learning, visualizing complex concepts, providing access to real-time geographic data, and giving students a more engaged and in-depth learning experience. The use of digital learning tools in geography education can also have the potential to provide more interesting and interactive learning experiences, increase students' understanding of geographic concepts, and prepare them for the challenges of an increasingly connected world (Strobl, 2007).

The previous explanation has shown that innovation in geography learning, especially through the use of digital learning tools, has great significance. Although some research in recent years has begun to examine the role of digital learning tools in geography education, the scope is still limited. Based on observations, these studies tend to focus on one particular digital learning tool and on specific geographic topics, while others lean more towards specific pedagogical aspects, and seek to assess their impact on student achievement. In addition, it is difficult to find research that looks comprehensively and systematically at the use of digital learning tools in geography education.

SLR (Systematic Literature Review) analysis is a research method used to identify, evaluate, and synthesize existing literature on a particular topic. This involves a systematic and rigorous process of searching for relevant studies, screening them based on predetermined inclusion criteria, and analyzing their findings. The goal of the SLR is to provide a comprehensive and unbiased summary of the available evidence regarding a particular research question (D. Davies et al., 2013). SLR helps in understanding the breadth and depth of existing research and identifies gaps for further research. Second, SLR makes it possible to organize, analyze, and synthesize groups of related literature to test specific hypotheses and/or develop new theories. Third, SLR can be used to evaluate the validity and quality of existing research (Xiao & Watson, 2019). SLR studies regarding the use of digital learning tools are still very limited. Only a few of them were found regarding the use of digital courseware used in teaching and learning in geography subjects for secondary school students (Ghafar et al., 2023). Apart from that, there is also research related to the evaluation of digital technology, such as GIS, which can be a relevant tool in teaching and learning geography (Konstantakatos & Galani, 2023). Based on these observations, no SLR analysis studies related to the use of digital learning tools in geography education have been found that are more comprehensive and systematic. Therefore, this SLR research wants to thoroughly examine the use of digital learning tools in geography education with systematic procedures according to SLR analysis. In this regard, there are several research question, namely (RQ1) What types of digital learning tools are used in geography education? (RQ2) What impact does the use of digital learning tools have in geography education? (RQ3) What obstacles are faced in using digital learning tools in geography education?

The use of digital learning tools is very important in the current and future educational context, because this not only reflects adaptation to technological advances, but is also an effort to improve the quality of learning through the use of innovative technology. This research is important because it will provide insight into the types of digital learning tools that are effective in geography education, help evaluate the impact of using digital learning tools in geography learning, and identify barriers to the use of digital learning tools in geography education. Ultimately, it is hoped that this will help educators and learning tool developers make better decisions about which learning tools to use to improve the effectiveness of teaching and learning

Method

This study follows the SLR methodology adopted from EPPI-Centre y (EPPI-Centre, 2007) and Acquah & Katz (Acquah & Katz, 2020), with relevant adjustments made to align with the research objectives. The stages in this SLR research were as follows:

1. Scoping the review
2. Searching for studies
3. Determining inclusion criteria and exclusion criteria
4. Study selection
5. Data analysis
6. Conclusions/recommendations

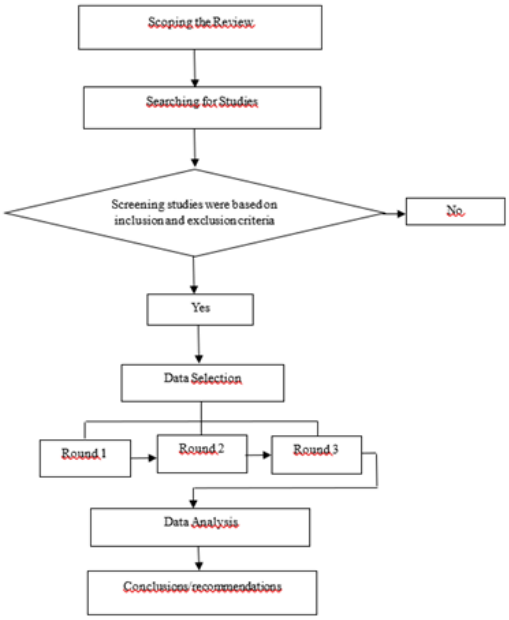

Figure 1. Flow chart illustrating systematic review process

Scoping the Review

At this stage, the research topic is clearly identified. Then proceed with formulating research questions, as explained in the introduction. This involves identifying the relevant type of study, the time period of the study, the language, and the specific topics or issues to be included in the analysis. This stage helps ensure that the research focuses on clear and relevant research questions, allowing for a more targeted and accurate literature search in line with the research objectives.

Searching for Studies

This section involves selecting a database and determining keywords used to search for literature according to the research topic. The data source in this research is the Scopus Database. The reason for choosing the Scopus Database is because Scopus is one of the largest curated abstract and citation databases, with extensive global and regional coverage of scientific journals, conference proceedings and books, while ensuring only high-quality data is indexed through rigorous content selection and re-evaluation by Independent Selection and Content Advisory Board (Baas et al., 2020).

In searching the literature, the author identified several things, namely (1) it must be related to digital learning tools or types of digital learning tools as part of technology in the world of education (2) Terms related to geography education should be included because the context of this research leads to use of digital learning tools in geography learning. Based on these considerations, the keywords used in the search are "Digital AND Learning AND Tools AND Geography AND Education".

Criteria for Inclusion and Exclusion

In this stage, inclusion and exclusion criteria are applied to select articles that are appropriate to the research topic. Titles and abstracts were reviewed to assess their relevance to the established research questions. In this research, research may only be included if it meets the criteria, namely (1) research in the form of scientific

journals; (2) studies published in the last 5 years, starting from 2018-2023; (3) Written in English, and (4) Research is available in full text form. Articles that do not meet these criteria will be removed from the list. In addition, publications were also filtered by excluding (1) Publications that did not discuss the use of digital learning tools in geography education; (2) Research that does not discuss the impact of using digital learning tools in geography education; (3) Research that does not discuss obstacles in using digital learning tools in geography education/learning.

Study Selection

In this data analysis, a search was carried out on the Scopus database in September 2023 with the keywords "Digital AND Learning AND Tools AND Geography AND Education". The search results were 74 documents which were then filtered in 3 rounds as follows:

1. Round 1 = The selected documents are documents originating from various countries, published in the period 2018-2023, only scientific articles, and written in English. The selection results can be seen in Table 1.
2. Round 2: Selecting titles and abstracts without paying attention to the quality of each document. The type of document chosen discusses the use of digital learning tools and geography education. The selection results can be seen in Table 1.
3. Round 3: A more detailed study is carried out, including the title, abstract, keywords and contents of the document to decide whether the document in question is worthy of further study or not. The learning results are digital and can be accessed in full text

Table 1: Data Selection Results

Data Sources	Keywords	Result Based on Keywords	Round 1		Round 2		Round 3	
			In	Ex	In	Ex	In	Ex
Scopus	Digital AND Learning AND Tools AND Geography AND Education	74	29	45	24	50	13	61

Results and Discussion

Based on the Systematic Literature Review method explained in the methodology section, 13 studies that met the criteria were identified and systematically reviewed to answer the research questions that had been formulated. The results of the study can be seen in Table. 2

Based on the table above, the analysis results show various types of digital learning tools used in geography education, including Digital Story Mapping, Web GIS, Geobrowsers and VR Platforms, GIS-based map archive system, GPS-enabled portable air pollution sensor, Geographic Information Systems (GIS), Web GIS Platform, Digital Atlas WebGIS Application, VR Oculus Rift headset, Instagram, OSM (OpenStreetMap), Google Maps, and ESRI applications, geo-editors, and geotag photos. This type of digital learning tool has been used to enhance the geography learning experience and create an interactive learning environment.

The use of digital learning tools in geography education has had a positive impact. These impacts include increasing ICT skills, increasing multi-literacy skills, active and student-centered learning, increasing geographical thinking skills, increasing understanding of spatial concepts, increasing digital competence, improving learning outcomes, increasing student motivation and engagement, and developing geographic skills and understanding of sustainability issues. These digital learning tools have also improved students' understanding of local air quality and spatio-temporal variations in air pollution concentrations through real-world experiences.

The use of digital learning tools in geography education is also faced with various obstacles. These obstacles include limited technical resources, lack of additional training for teachers, limited access and infrastructure, lack of skills and training for teachers and students, dependence on technology, lack of relevant content, digital divide, limited devices available, limited internet connection , platform complexity, limited knowledge and information, as well as limitations in data collection and interaction with the system.

Table 2: Literature identification results

Study	Year	Types of digital learning tools	The impact of digital learning tools	Obstacles to using digital learning tools
(Anunti, 2023)	2023	Digital Story Mapping	Improved ICT Skills, Improved Multi-literacy Skills, Active and Student-Centered Learning, Improved Geographical Thinking Abilities	Limited Technical Resources, Lack of Additional Training for Teachers, Time Limitations
(Puertas-Aguilar, 2023)	2023	Web GIS	Increase Understanding of Spatial Concepts, Improve Digital Competence, Improve Learning Outcomes, Increase Motivation and EngagementIncrease Motivation and Engagement	Limited Access and Infrastructure, Lack of Training and Skills, Lack of Training and Skills, Dependence on Technology, Lack of Relevant Content, and Digital Divide
(Daniele, 2022)	2022	Geobrowsers and VR Platforms	Improve geographic skills, Encourage understanding of sustainability issues, Increase student engagement, and Enrich learning experiences	Limited devices available, Limited internet connection, Lack of training, Platform complexity, Time limitations
(Bedair, 2022)	2022	GIS-based map archive system	Improves the learning process, increases student interaction with maps, and provides necessary learning tools. In addition, the use of digital technology in geography learning can create an interactive and efficient learning environment. With digital learning tools, students can more easily understand the material and develop their geography skills.	Limited Knowledge and Information, Skills in Changing Paper Maps to Digital, Suitability of Open Source Platforms, Teacher and Student Readiness
(Park, 2021)	2021	GPS-enabled portable air pollution sensor	Increase students' understanding of local air quality and spatial-temporal variations in air pollution concentrations through real-world experiences, as well as strengthen skills and knowledge gained in the classroom.	GPS Attachment Limitations, Sensor Data Limitations, Cost and Time Limitations, Privacy Limitations
(Labianca, 2021)	2021	Geographic Information Systems (GIS)	Development of critical thinking and greater awareness of continuous learning. Apart from that, the use of GIS has also encouraged the development of personal skills, critical thinking abilities, and active participation in society.	There is a need to have a "toolbox", there is limited time available and a lack of basic knowledge of students, the end user has a role that is not neutral and reflects the observer's point of view
(Csachová, 2020)	2020	Web GIS Platform	Increase student engagement, understanding and skills, spatial thinking, and relationships between subjects.	Limited digital skills of teachers, limited availability of digital technology equipment in schools, and lack of teacher training in the use of geospatial technology
(González, 2020)	2020	Digital Atlas WebGIS Application	Increased Spatial Thinking Ability, Increased Geographic Knowledge, Formation of Responsible and Active Spatial Citizenship, Instructional Effectiveness, Confirmation for	Lack of Teacher Involvement in Secondary Schools, Lack of Resources, Limited Research Samples, Level of Resistance to Technology:

			Geospatial Technology Integration	
(Detyna, 2020)	2020	VR Oculus Rift headset	Increases student engagement, helps them achieve learning goals, and provides an immersive visual experience	Confusion using hardware, differences in quantitative data between geography students in experiment 1 and experiment 2
(T. Davies, 2019)	2019	Instagram	First, it enables students and teachers to record, manipulate, and interpret a higher quantity and quality of visual data compared to previous technologies. Second, Instagram enables real-time student feedback and engagement, facilitating critical thinking and problem solving online. Additionally, incorporating Instagram into teaching practices helps connect students' familiarity with social media and encourages student-directed learning. Lastly, Instagram provides a platform for students to explore and interpret the world around them,	Understanding technology, dependence on technology, financial limitations, limitations in using Instagram, and obstacles in using Instagram in the field
(Huyer, 2019)	2019	OSM (OpenStreetMap), Google Maps, and ESRI applications, geo-editor" and "geotag photos	Increase students' understanding of digital maps, digital data analysis, and their implications, and enable students to explore and get to know more deeply the structure of the city or area around their school.	The need for ready access to use smartphones and computers as the main platform for learning
(Reynard, 2018)	2018	InterGEO: Moodle e-learning platform and videoconferencing technology	Dissemination of Knowledge, Expanding Access, Collaboration between Universities, Complementing Conventional Lectures, Student Involvement	Content that does not conform to partner universities' teaching plans, Future evolution of the platform, Student engagement and successful learning, Copyright issues, Language
(Pingel, 2018)	2018	JavaScript based web-map	First, this tool increases student interest and involvement in learning by providing an experience similar to playing games. Second, this tool helps students build global cognitive maps in a more structured and coherent way. Third, this tool provides additional insight into how students construct their understanding of spatial relationships in the world.	Limitations of Data Collection, Limitations of Interaction with the System, Limitations of the Tool Itself

Apart from that, there are also obstacles such as limited GPS devices, limited sensor data, limited costs and time, privacy, lack of teacher digital skills, limited digital technology devices in schools, lack of teacher training in the use of geospatial technology, insufficient teacher involvement in secondary schools, lack of resources, limited research samples, and level of resistance to technology. There are still obstacles such as confusion in using hardware, understanding of technology, dependence on technology, financial limitations, limitations in using Instagram, as well as obstacles in using Instagram in the field.

The level of need for easy access using smartphones and computers as the main platform for learning is also an obstacle. There are also obstacles related to content that does not match the teaching plan, future evolution of the platform, student engagement and learning success, copyright issues, and language. Finally, there are obstacles related to interaction with the system, and limitations of the tool itself.

The results of this analysis provide a comprehensive picture of the types of digital learning tools used in geography education, the impacts obtained from their use, and the obstacles faced by educators and students in adopting this technology. This knowledge can be the basis for developing more effective strategies for integrating digital learning tools in geography education..

This research reveals valuable findings related to the use of digital learning tools in geography education. There are three main aspects that need to be considered in the context of this discussion: diversification of digital learning tools, positive impact on student learning outcomes and skills, and challenges in implementation.

First, the diversification of digital learning tools is one of the most striking aspects of these findings. The types of digital learning tools that have been identified, such as Digital Story Mapping, Web GIS, and VR Platforms, show great potential in enriching the geography learning experience (Daniele, 2022; Huyer, 2019). This diversification gives educators the opportunity to present material in interesting and varied ways (Bedair, 2022), increasing student engagement (Csachová, 2020; Daniele, 2022; Detyna, 2020; Pingel, 2018) and accommodating various learning styles.

Second, the use of digital learning tools in geography education appears to have a significant positive impact on student learning outcomes and skills (Park, 2021; Puertas-Aguilar, 2023). Improved ICT skills, multi-literacy skills, and geographical thinking abilities emphasize the importance of integrating these digital tools in the learning process (Anunti, 2023; Daniele, 2022). The results of this study also noted increased student motivation and engagement, which can promote more effective and student-centered learning (Anunti, 2023; Davies, 2019; Puertas-Aguilar, 2023).

Third, the challenges in implementing digital learning tools are an aspect that cannot be ignored. Obstacles such as limited technical resources (Anunti, 2023; González, 2020), lack of additional training for teachers (Anunti, 2023; Csachová, 2020; Daniele, 2022; Puertas-Aguilar, 2023), as well as limited time (Anunti, 2023; Daniele, 2022; Labianca, 2021), infrastructure and access (Puertas-Aguilar, 2023), need to be overcome immediately. Issues such as platform complexity, lack of relevant content (Daniele, 2022; Puertas-Aguilar, 2023; Reynard, 2018), and the digital divide require serious attention in order to ensure maximum utilization of these digital tools in the context of geography education (Puertas-Aguilar, 2023).

Conclusion

This study provides valuable insight into the use of digital learning tools in geography education. The findings show that the use of digital learning tools has great potential to enrich geography education in the digital era, with the important note that the challenges in implementation need to be given serious attention so that the benefits can be realized. Diversifying digital learning tools can produce more interesting and varied learning experiences, as well as improve students' understanding of geography concepts. Positive impacts are also seen in improving students' ICT skills, multi-literacy skills, and geographical thinking abilities, which makes the integration of digital tools a valuable asset in achieving educational goals. However, challenges in implementation, including limited resources and teacher training, as well as gaps in access and infrastructure, need to be addressed so that the benefits of digital learning tools can be felt equally. The implication of these findings is the need to increase teacher training, improve educational technology infrastructure, and develop relevant curricula. In addition, further research involving long-term evaluation and in-depth analysis of the impact of using digital learning tools will enrich understanding of the benefits of using technology in geography education. This will help in developing best practices and ensuring that technology is used effectively to improve student learning outcomes and skills. By taking these steps, geography education can keep up with the times and ensure that students are ready to face the demands of an increasingly digital world.

Recommendations

Based on the results of research regarding the use of digital learning tools in geography education, recommendations that can be taken are to improve teacher training in terms of use, handling and maintenance of

digital devices and software. Schools and educational institutions need to invest in adequate technological infrastructure, including stable internet access and the latest hardware. The development of a geography curriculum that includes relevant digital learning tools should also be prioritized. It is important to continue to carry out in-depth evaluations of the effectiveness of using technology in geography learning and overcome technical barriers such as limited resources. Collaboration between teachers and educational institutions in the exchange of experiences will also enrich the implementation of technology in geography teaching.

Scientific Ethics Declaration

Budi Rahmah Panjaitan., Epon Ningrum., and Bagja Waluya declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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The role of Macrosocial Structures, Political Institutions, and Elites in the Process of Autocratization in the 21st Century

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Abstract: Objective: To explore the causal factors of democratic decline in Ecuador during the period 1996-2019, with a focus from 2007 onwards, paying attention to the levels of social reality: structures, institutions, and political actors. Methods: Based on the political sociology approach, the multivariate techniques of Co-inertia and Statis were applied, using three tables with sets of variables from each level of social reality. Their joint variance was analyzed. The observation units were each year of democratic regime governance, aggregated into the country-year unit. Results: Both Co-inertia and Statis give greater explanatory weight to the variables of political actors in the process of democratic decline, distinguishing three sets of variables that explain three different government periods of the decline. Discussion: The electoral variety of democracy contradicts the egalitarian variety in the Ecuadorian case. Statis has a greater capacity to represent the variance of the variable tables. Conclusions: Statis and Co-inertia highlight the influence of actors. There is a critical juncture in 2007-2008 related to electoral democratic decline and an increase in egalitarian variety. Radical parliamentary elites and most of the president's party influence the decline, while the radicalism of parliamentary elites is related to an increase in equality and the Human Development Index, especially in 2009-2012.

Keywords: Democracy, Democratic decline, Political elites, Co-inertia, Statis

Introduction

Democratic decline is a current phenomenon in the twenty-first century, the literature enunciates it as "third wave of global autocratization" (Lührmann & Lindberg, 2019) although they have questioned whether every democratic decline is linked to a historical wave (Tomini, 2021), this observation gained strength when in the third wave of democratization identified by Huntington (1994) there were deviant cases after the end of the Cold War in Eastern Europe that the wave did not explain. Therefore, instead of pigeonholing all countries in a global trend, it is called for attention to authoritarian trajectories in similar geographical or historical cases or regions (Cassani & Tomini, 2019). Ecuador was identified as a case of accelerated democratic decline in the *Varieties of Democracy* (V-Dem) reports (Maerz et al., 2020), as well as an iconic case of the Latin American region both in its autocratic trajectory between 2006 and 2016 as well as for its ability to return to previous democratic standards in 2017 (Cassani & Tomini, 2020). However, here it will be addressed temporarily until 2019 to assess whether the decline continued after Rafael Correa's periods of Government.

The explanations of the case have ranged from factors of the international community and external interests (de la Torre, 2017, 2018), as well as to the economic and institutional structural conditions of erosion of horizontal responsibility (Laebens & Lührmann, 2021; Ulloa, 2017; de la Torre, 2013), as well as Rafael Correa's personalistic strength as a charismatic leader in alliance with political elites (Bull & Sánchez, 2020; Sanchez, 2022; de la Torre, 2019; Freidenberg, 2012), as well as in the electoral strength of the re-elections of presidential leaders that limit the alternation of power to the point of caudillismo in the trajectories of power administration within the framework of the political cycle of the turn to the left in Latin America (Torrico & Diego, 2019; Treminio Sánchez, 2019; Sánchez López & García Montero, 2019). The following is a summary of the main arguments linked to the variables of the three levels of social reality: structures, institutions, and political actors.

- Selection and peer-review under responsibility of the Organizing Committee of the Conference

Structural Variables

Variables related to the economic and structural conditions of a country are addressed. These variables include economic inequality, international cooperation, foreign debt, among others. Economic inequality is debated as a factor that can lead to both democratic decline and the strengthening of democracy. It also considers the distribution of wealth and its impact on support for authoritarian leaders and regimes. In addition, the relationship between the Human Development Index (HDI) and democratic decline is observed, and it is suggested that countries with medium human development may experience democratic decline earlier than poorer or richer countries (Przeworski, 2019; Epstein et al., 2006; Boix & Stokes, 2003; Cheibub et al., 1996; Przeworski, 1981).

Institutional Variables

Political institutions and their role in democratic decline are analyzed. It examines the relationship between parliament and the president, as well as the control of parliament through parliamentary majorities or governing coalitions. In addition, the importance of coercive state capacities, including alliances with the Armed Forces and repressive apparatuses of the state, is highlighted. It also considers the bureaucratic state capacity to extract resources and improve the well-being of the population through economic policies and the quality of service of public officials (Croissant & Pelke, 2022; Fortin-Rittberger, 2014; Hanson, 2018; Hendrix, 2010).

Stakeholder Variables

Actors are considered political elites and have a central role in the decline of democracy. According to some research, it is the actors and their mobilization based on rational calculation or normative preferences about democracy that explain the political process of democratic decline or its sustainment. The parliamentary elites' support for democracy and their radicalism are cited as determining factors in the electoral variety of democracy (Bull & Sánchez, 2020; Thiébault, 2018; Dargent, 2014; Freidenberg, 2012). The main objective of the study is to measure the relationship between these variables and democratic decline in Ecuador during the period 1996-2019. A specific definition of democratic decline based on the Electoral Democracy Index (EDI) is used. The varieties of egalitarian and participatory democracy are also included as control variables (Bohigues, 2021a).

Method

The analytical framework of political sociology is used, which looks at factors from sociology and political science in independent variables or causal conditions to explain the dependent variable or outcome (Lipset & Rokkan, 1967; Sartori, 1969). In addition, three levels of social reality are addressed (Sztompka, 1995a): A) the structural level where there are macro-level variables such as international cooperation that does not depend on local actors or citizens, B) the medium level that addresses national and institutional variables such as spending on the armed forces or state capacity. and C) the micro level that observes the actors understood as political elites. The method of political sociology sets in motion and analyzes the interaction between the levels of social reality (Sztompka, 1995b), as well as between variables of sociology and political science (Sartori, 1969). In order for this interaction to be clearly shown, two multivariate statistical techniques were chosen that allow the analysis of covariance between the different levels and fields of the social sciences: Co-inertia and Statis. Co-inertia comes from biology whose purpose is to analyze the relationship between species and environments in various types of climatic floors (Chessel & Mercier, 1993). Based on previous applications in other fields of science (Bady et al., 2004; Culhane et al., 2003; Dray et al., 2003), here it is proposed to use co-inertia in a creative and innovative way to analyze the relationship between the levels of social reality (structures, institutions and actors). In summary, co-inertia allows us to find the common structure of two groups of variables based on Escouvier's Rv coefficient (Robert & Escoufier, 1976). Co-inertia allows us to identify the maximum shared variability between the set of variables in one table and the other, the high values (>.70) indicate that the two structures vary simultaneously, directly or inversely, and it is low or null when the structures vary independently or do not vary. In the case of the data of the present research and given that the technique allows the analysis of only two pairs of tables, a cross was made between the variables of actors and structures (act. x est.), institutions and structures (inst. x est) as well as actors and institutions (act. x inst.).

On the other hand, Statis is a multivariate technique that allows a 3-way analysis, i.e. three tables with different groups of variables (L'Hermier des Plantes, 1976). In addition, its versatility allows the same number of

individuals, measured on the same set or different variables, to be analyzed at different times; even different individuals with the same set of variables at different times. Again, the previous application in other fields of science such as mathematics, ecology, biology, computing or education (Bauz-Olvera et al., 2019; Caballero-Juliá et al., 2017; Ramos et al., 2021; Ruiz-Toledo et al., 2022; Taranto-Vera et al., 2021) offer a guide to using this technique creatively and innovatively in the social sciences. Here it is no longer analyzed by pairs of sets of variables, but a matrix of vector correlations is found between the matrices, they are decomposed based on the vector correlations to project them in a low-dimensional subspace (biplot) and a consensus matrix is calculated as a weighted average, this presents the distribution of the individuals according to their relationship with the groups of variables. At the end, their trajectories should be analyzed according to vector projections in the low-dimensional subspace. The result is a table of vector correlations between the k-tables expressed by the Rv coefficient of Escoufier (1976). Then, the relationship between the groups of variables and the distribution of individuals in the consensus table is analyzed. In the present research, each k-table collects variables from each level of social reality: structures, institutions and actors, and the observations are each year of government in a country.

Sources of Information

The main sources of information are presented in the following table, which indicates the level of reality to which it theoretically belongs according to the literature of political sociology, as well as its theoretical-analytical dimension, the name of the variable and the abbreviation that was used to visualize in the software

Table 1. Variables of the levels of social reality*

Level	Dimension	Variable	Abbreviation	Fountain
Structure	International enclave of the regime	International cooperation	coop.int	World Bank
Structure	International enclave of the regime	External debt	deu.ext	World Bank
Structure	Economy and development	GDP per capita	pib.c	World Bank
Structure	Economy and development	Inequality	gini.w	World Inequality Database
Structure	Economy and development	Human Development Index	idh	PNUD
Institutions	Quality of Electoral Democracy	Electoral Democracy Index	edi	V-Dem
Institutions	Participatory democracy	Participative democracy component	d.part	V-Dem
Institutions	Egalitarian democracy	Egalitarian democracy component	d.ig	V-Dem
Institutions	State Powers	Balance of power	eq.p	Polity5
Institutions	State Powers	Legislative with presidential majority	leg	Election results
Institutions	State Powers	Duration of the scheme	t.dur	Polity5
Institutions	Coercive capacities	Coercive capacity	pib.mil	World Bank Military expenditure (% of GDP)
Institutions	Coercive capacities	Security Capability	in.seg	World Bank Intentional homicides (per 100,000 people).
Institutions	Infrastructural capacity	Effective Government-Degree of Bureaucratization	bur1	World Bank
Actors	Executive Elite	Presidential Re-Election	re.pres	Election results
Actors	Executive Elite	Political alternation	alt	Alcántara, Buquet y Tagina (2018)
Actors	Parliamentary Elite	Political alternation	elt.a	PELA-USAL
Actors	Parliamentary Elite	Political radicalism (polarization)	rad	PELA-USAL

* Data were scaled to have similar units. Thus, the values expressed in billions of dollars of foreign debt can be compared with the indices of democracy ranging from 0.01 to 1.00.

Information Processing

Each database was compiled in its original version established by each institution, then the data were transferred to an Excel file to systematize the data and order them according to the theoretical orientation of the levels of social reality. Once the database was ready for the research on democratic decline for the Ecuadorian case, the "Multibiplot" software (Vicente-Villardón, 2015) from the Department of Statistics of the University of Salamanca was used, as well as the "R" software with the RStudio version 2023.06.0+421.In the case of co-inertia, both softwares were used to obtain the algebraic results, but only Multibiplot was used to elaborate the graphs. In the case of the Statis, R was used exclusively.

Results and Discussion

Co-inertia: Institutions and Structures

The co-inertia analysis yielded the following results for the crossover between institutions and structure. Escoufier's Rv coefficient of vector correlation between X and Y is close to 0.7 (0.63), indicating shared covariance. It doesn't exceed the theoretical threshold, but it doesn't go low either. The p-value of the Monte-Carlo test is <0.05 (0.001), that is, there is enough statistical evidence to affirm that there are significant differences, so "H0" is rejected, which says that there is no co-structure between X and Y, "H1" is accepted, which indicates that there is co-structure. Based on the first two eigenvectors, 99.53% of the shared variance can be explained, which guarantees a good representation (Figure 1 & 2).

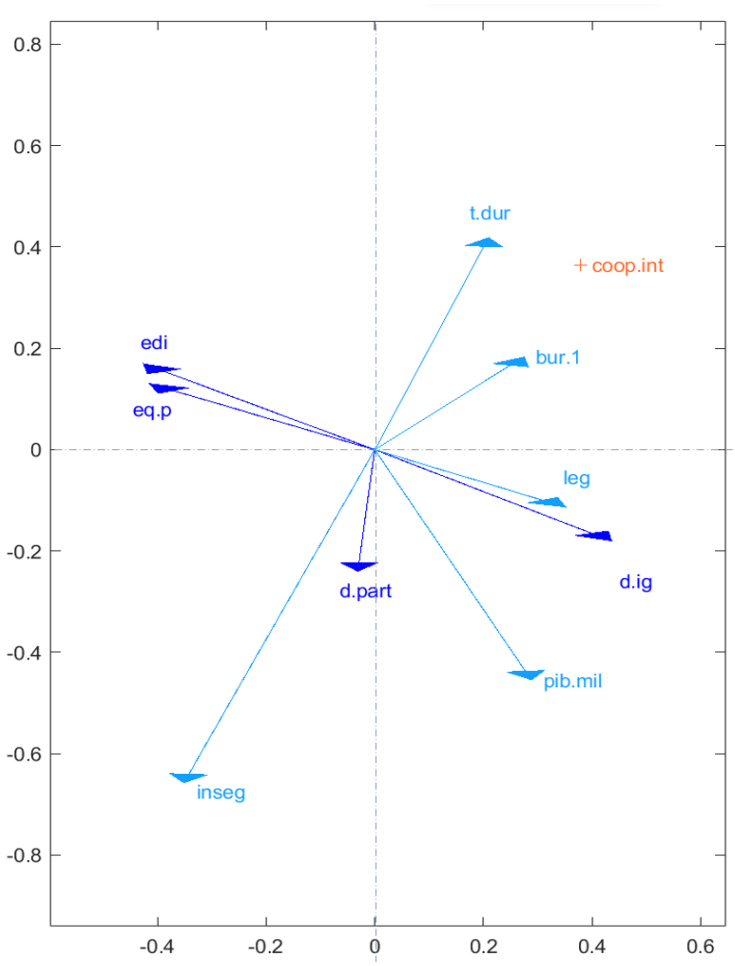

Figure 1. Biplot of institutions and structure, focus on institutions.

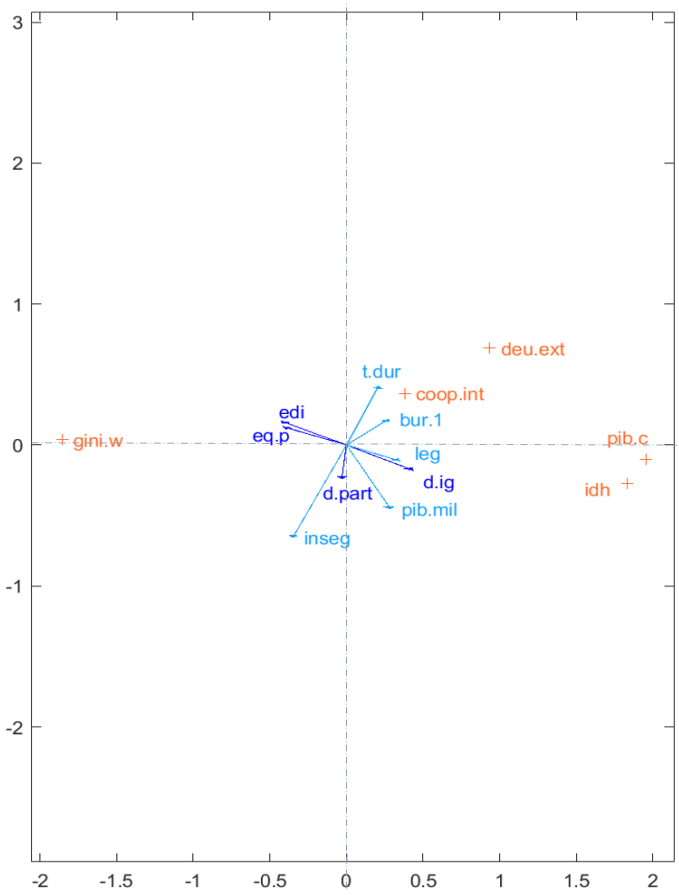

Figure 2. Biplot of institutions and structure, total vision.

High values in electoral democracy (EDI), which indicate democratic quality, are strongly correlated with the balance of power variable (eq.p); At the same time, the structural variable of inequality (GINI.w) also increases with these institutional variables. On the other hand, egalitarian democracy (e.d.) is negatively and inversely correlated with electoral democracy and the balance of powers. While it is positively and directly correlated with a legislative with a partisan majority of the ruling party (leg), while it has a positive but not as strong correlation with the percentage of GDP for the military (pib.mil). These last institutional variables present high values together with the economic structural variables of GDP per capita (GDP) and the Human Development Index (HDI). Insecurity (in.seg) and participatory democracy are slightly correlated, the vector of the latter is very low. On the other hand, insecurity is negatively and inversely correlated with the duration of the regime (t.dur), where it stands out that the external debt presents structurally high values that coincide with the years that a regime lasts.

Co-inertia: Institutions and Actors

The representation of the vectors remains the same for the variables of the political actors, with the exception of pib.mil and d.part. The edi and eq.p are associated with high values in alternation (alt), while d.ig and legi are associated with the radicalism of parliamentary elites (rad) and presidential re-election (re.pres). In addition, the triplot (Figure 4) shows that two periods of government are presented with these two combinations of institutional and actor variables. The 2013-2016 period is inversely correlated with electoral democracy and the balance of powers, but the egalitarian variety of democracy increases, as well as the power of the president's party in parliament, while there are high values in the radicalism of parliamentary elites and presidential re-election.

The 2017-2019 period constitutes a transformation of the regime from an egalitarian democracy to an electoral one, based on the support of the parliamentary elites for democracy, accompanied by GDP for the military, as well as the bureaucratic quality of the institutions and the duration of the regime. The period 2009-2012, which theoretically also belongs to the decline, does not present higher average values to affirm that it clearly belongs to a set of variables, but it is associated more with the period 2017-2019 than with 2013-2016.

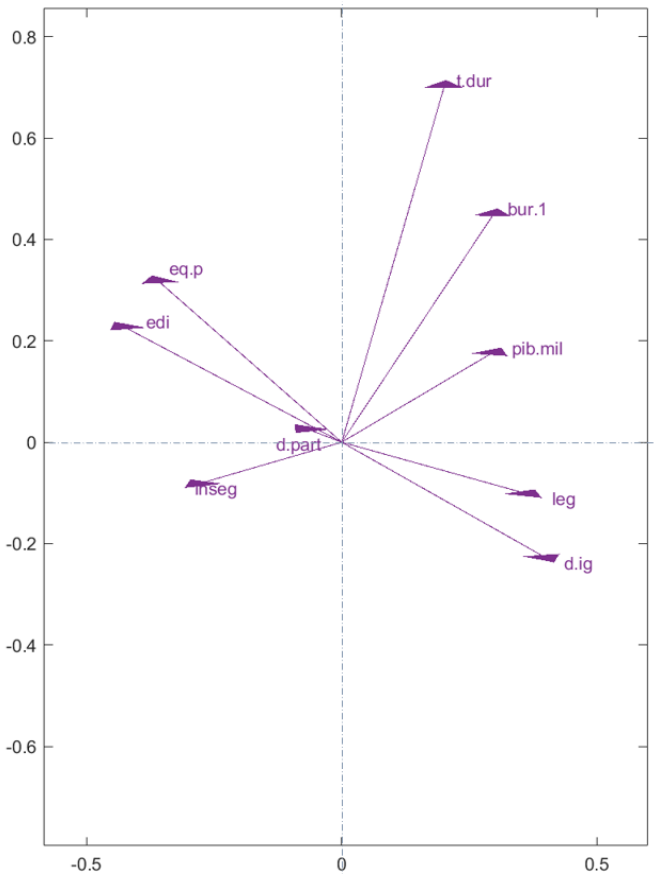

Figure 3. Biplot of institutions and actors, emphasis on institutions.

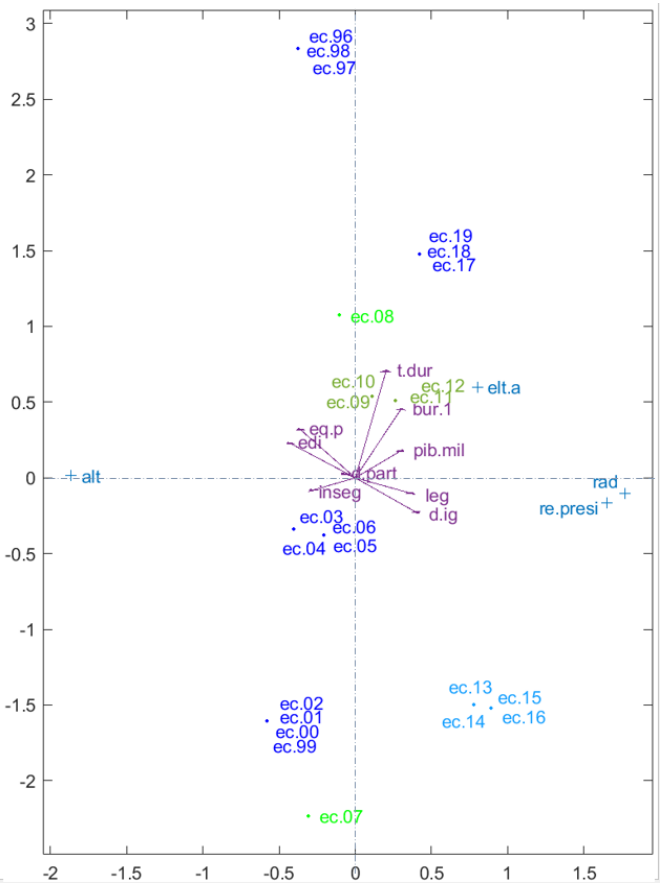

Figure 4. Triplot of institutions and actors, total vision (includes country-year).

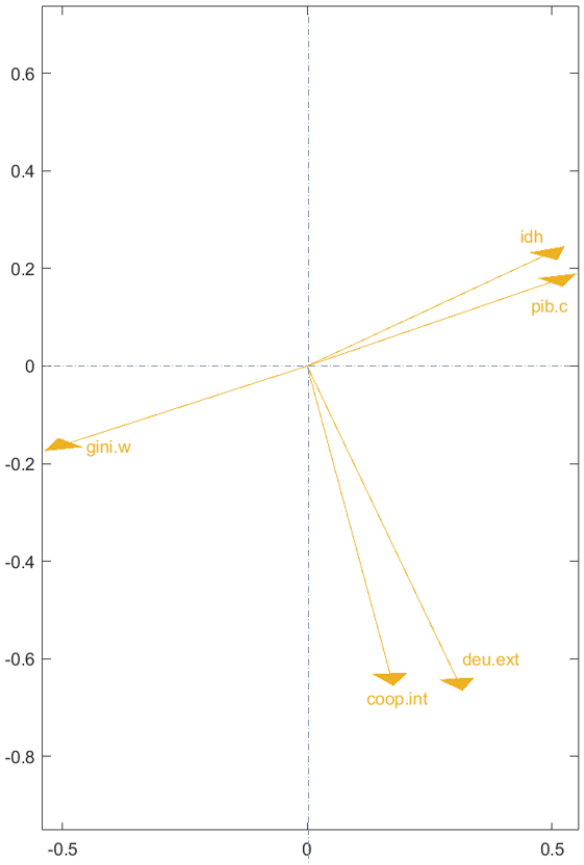

Figure 5. Biplot of actors and structures, emphasis on structures.

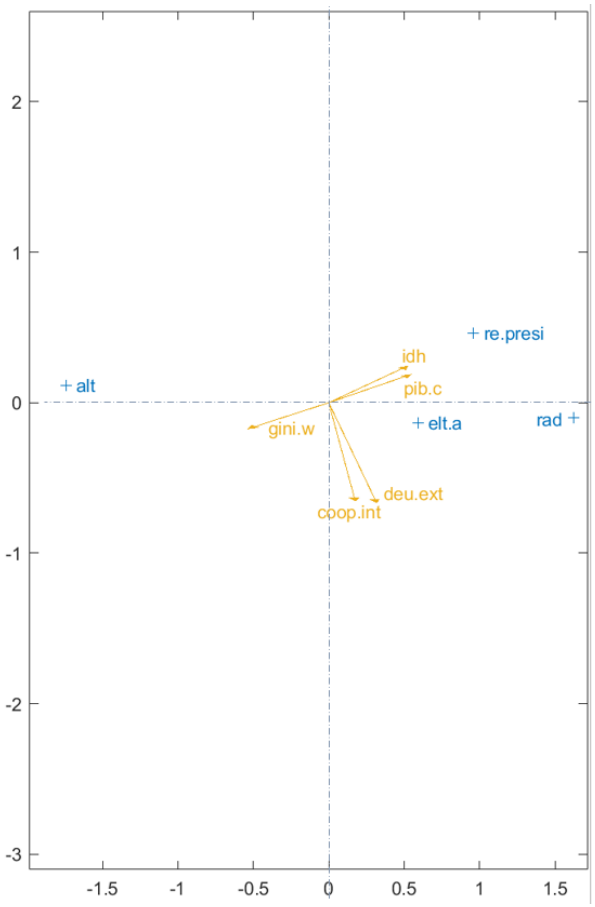

Figure 6. Biplot of actors and structures, total vision.

Co-inertia: Actors and Structures

Escoufier's Rv coefficient of vector correlation between X and Y is greater than 0.7 (0.75), indicating high shared covariance. The p-value of the Monte-Carlo test is <0.05 (0.001), i.e. there is sufficient statistical evidence to reject "H0" of non-co-structure between X and Y, "H1" of self-co-structure is accepted. Based on the first two eigenvectors, 99.8% of the shared variance can be explained, which guarantees a good representation (Figure 5 &6).

There is a direct positive correlation between the HDI and GDP, which is associated with high values of re.pres and rad, while the a.g.s has values that are low than the average to establish a strong relationship with HDI and GDP. That combination is contrary to gini.w which is associated with high alt values. Thus, the radicalism of parliamentary elites and presidential re-election are associated with the Human Development Index and the increase in GDP per capita. On the other hand, inequality increases when political alternation also increases. The variables coop.int and deu.ext are strongly correlated, but they are unrelated to either of the other two groupings of variables. This would indicate that the variables linked to international relations are not affected by local actors, nor are they directly related to the variables of the national economy in the period analyzed.

Statis

According to the analysis of the 3 joint tables with the Statis technique, Escoufier's Rv coefficient for crossovers between actors and structures is 0.92, between actors and institutions is 0.93 and between institutions and structures is 0.89. All cases show high values that indicate similar structure between the levels of social reality. The values of cosine2 (>.90) and the weights of each k-table (>0.50) are also high, which guarantees a good representation to construct the commitment figure. Regarding the interstructure, the first 2 components explain 98.12% of the variance of the k-tables. In the commitment, the first 2 components explain 88.32% of the variance. In all cases, the variance explained is high.

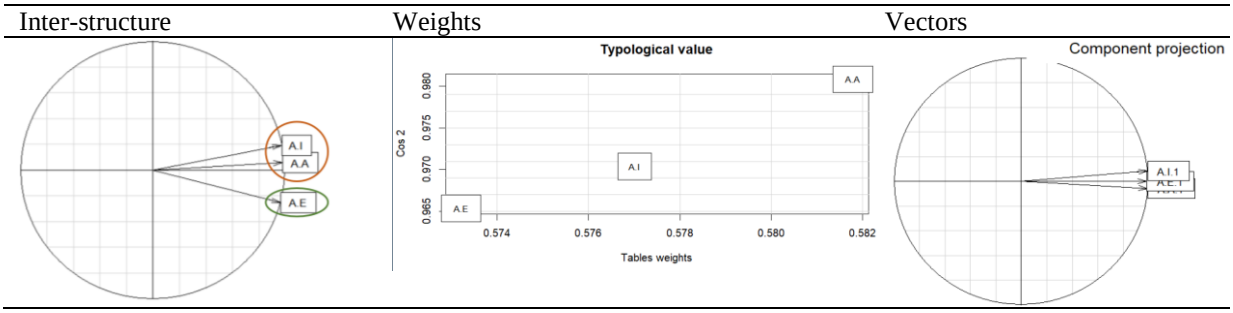

Figure 7. Statis: interstructure, weights and vectors

Figure 7 shows a higher correlation between agent and institution k-tables. The weights that contribute the most to the commitment are the variables of the actors. And the extension of the eigenvectors shows that the three k-tables are well represented because they go all the way to the edge of the projection in the vector graph.

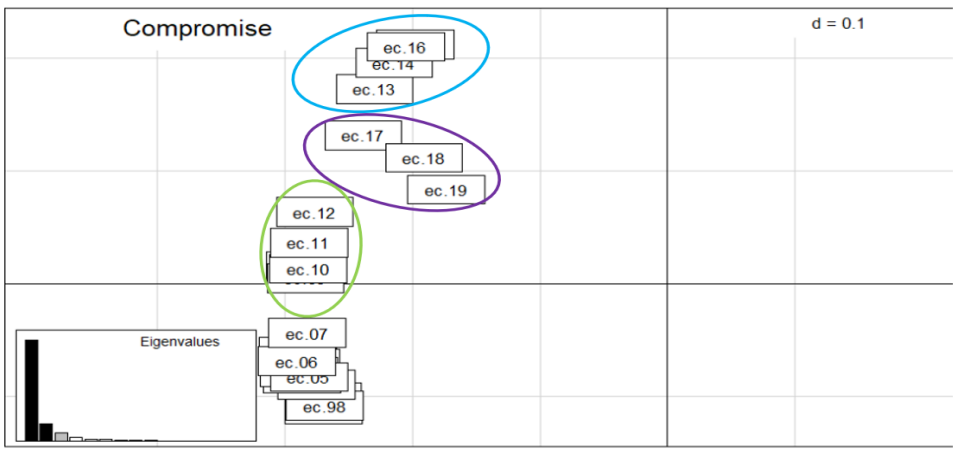

Figure 8. Statis: Compromise

The representation of commitment distinguishes the cases of Ecuador's democratic decline on the axis of the X's, period 2009-2019, while distinguishing them by their typology in three sub-periods of each government: 2009-2012, 2013-2016 and 2017-2019. The time period 1996-2008 appears indistinguishable in the commitment, this period would be the democratic one, while the 2009-2019 period would be the one of decline, with its sub-processes.

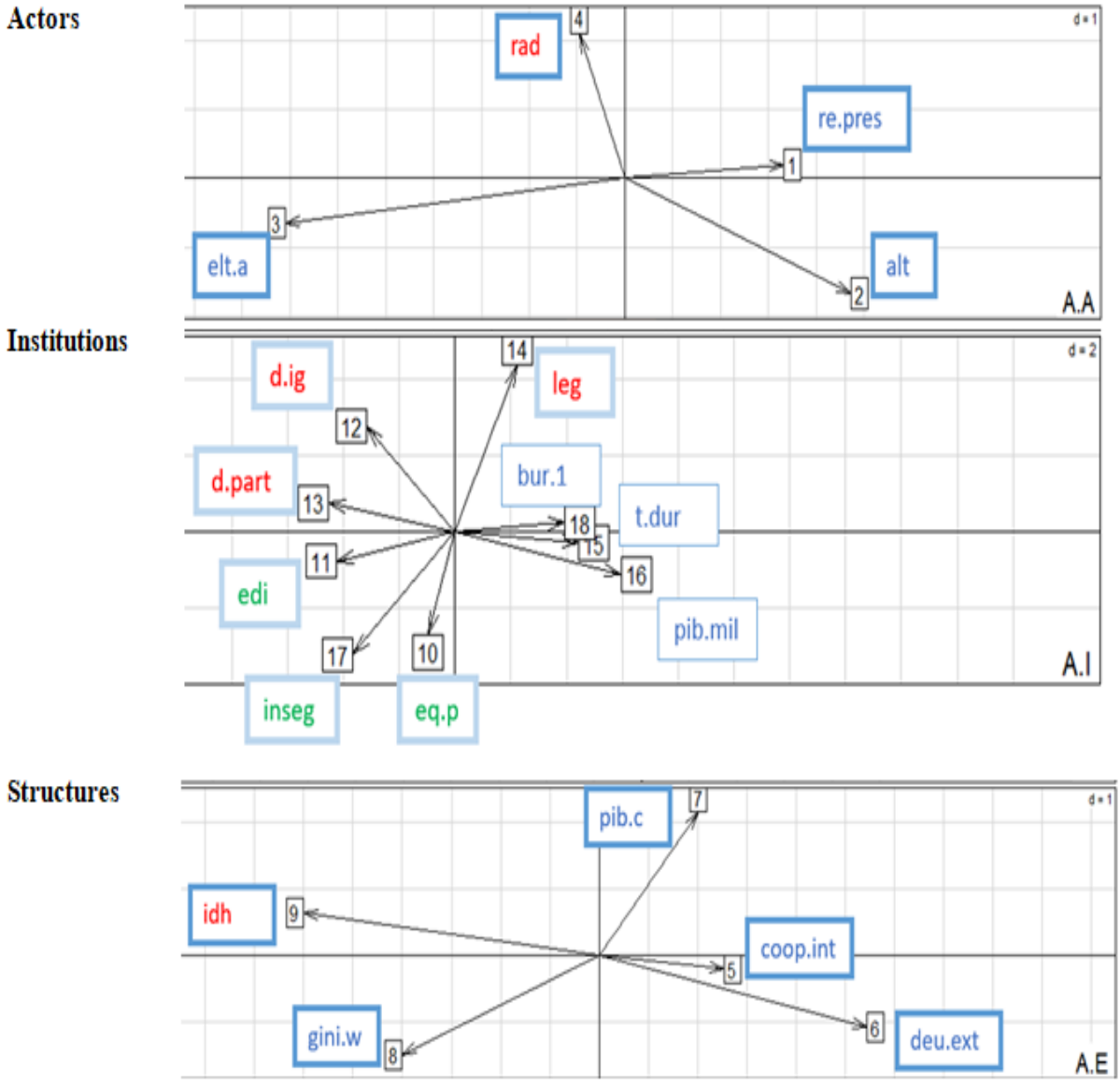

Figure 9. Statis: intra-structure of each k-table

For the interpretation of each intra-structure of each k-table, which here represents each level of social reality, attention must be paid to the position of the individuals (country-year). Based on these joint positions, the relationship between the levels and the country-year observations is established. Episodes of democratic decline present above-average values in the radicalism of parliamentary elites (rad), in the Human Development Index (HDI) and in the varieties of egalitarian democracy (d.gi) and participatory democracy (d.part).

The years with the highest quality of the electoral democracy variety present higher values in their average in the support of parliamentary elites for democracy (elt.a), balance of state powers (eq.p), as well as high values in insecurity (in.seg) and high inequality (gini.w). Regarding the period, 2009-2012 presents high values in hdi, and partially high in d.part and d.ig, although the latter would not be above average. The period 2013-2016 presents high values in rad and d.ig, as well as leg. In the 2017-2019 period, there is no direct correspondence to a particular variable, but it would belong globally to all those described in the two previous periods.

Specific Discussion

Review and Comparison of Statistical Techniques

Regarding the contribution of statistical processes, the Statis technique better represents the variables of the actors in the interaction of the levels of social reality and the country-year observation units, this may be associated with the partial scaling of the data in R that take the values of each level and not the data of all the joint tables. This methodological decision was made because the quality of the representation in the explained variance is higher with this scaling, especially in Escoufier's Rv coefficients, although the percentage of the explained variance in the components of the interstructure did not increase significantly. By placing each level of variables at the center in all the years of observation, the technique puts the actors at the center of the explanation of reality, with higher values in the weights for the commitment, which in turn distinguishes very well the periods of Ecuadorian decline.

When the scaling was total, the variables that best represent the model were the structural ones. This may indicate that when all the values of the k-tables are taken, the structural variables better model the variations of the institutions and actors in the political processes, even if the quality of representation of the country-year observations is lost. However, since all the values in the model are better represented by partial scaling, the decision was made to use it for analysis. Thus, in the interaction between the levels of reality, these calculations reinforce the argument that actors are the ones who guide changes in political processes (Gerschewski, 2023; Mainwaring & Pérez-Liñán, 2023, 2013; Haggard & Kaufman, 2016), as well as the relevance of parliamentary elites (Alcántara, 2021; Bohigues, 2021b, 2021a) to explain the decline, which also better describe the changes in each country-year unit, as well as in the ideal analytical unit of government periods.

On the other hand, co-inertia only expresses a moderately high Rv coefficient at the crossover between institutions and actors, a little lower between actors and structure, and much lower than the theoretical value even between institutions and structure. Unlike Statis, here it is not possible to compare with the types of scaling of the data, but in any case, the crosses of the k-tables with the structural variables are the ones with the lowest values in the Rv coefficient, which leaves the variables of the actors at the center of the explanation with the highest values in global terms. Again, this reinforces theoretical arguments about the relevant role of actors in explaining changes in political processes (Gerschewski, 2023; Mainwaring & Pérez-Liñán, 2023, 2013; Haggard & Kaufman, 2016), as well as the relevance of parliamentary elites (Alcántara, 2021; Bohigues, 2021b, 2021a) to partially explain the decline. However, co-inertia only represents well the period of Ecuadorian decline from 2013 onwards, leaving 2009 to 2012 unrepresented.

Discussion on the Levels of Social Reality

Both Statis and Co-inertia show that the values in the k-table with the variables of the actors best express the explained variance of the changes in the social process of democratic decline. In both techniques, the country-year observation units are distributed in such a way that the units with high values in electoral democracy are located on one side of the axis and the low values on the other. However, when it is controlled for the varieties of egalitarian and participatory democracy, a debate opens about the distribution of observation units.

Electoral democracy is inversely correlated with egalitarian democracy, and neither is related to participatory democracy, according to the representation of co-inertia. On the other hand, with Statis only electoral and participatory democracy are slightly correlated, while egalitarian democracy is related, but to a much lesser extent, to varieties of democracy. It is only when interpreted with country-year units that these relationships can be better analyzed.

The period 2009-2012 is the expression of the decline in the quality of the democratic regime, but at the same time it is close to the participatory variety, which includes the year 2008 that coincides with the process of the Constituent Assembly and an applied participation of civil society in Ecuadorian politics; at the same time, the Human Development Index rises markedly. The period 2013-2016 expresses the decline of electoral democracy deeper, but at the same time greater egalitarian democracy; At the same time, the parliamentary elites were radicalized in parliament and the ruling party had an absolute majority. Finally, the 2017-2019 period of decline is in an intermediate position because, although according to the descriptive data it has a recovery in the electoral variety of democracy, it does not recover the values prior to 2009, but neither does it increase the values in the egalitarian or participatory democratic varieties. This temporal description is valid in both the representation of Statis and Co-inertia.

The period of decline that is least easy to characterize is 2017-2019, this is because there is no evidence of a radical change in the average values of the three varieties of democracy. It is likely that there is a "path dependency" at the critical juncture of the years 2007-2008 that marks a trajectory of democratic decline in its electoral aspect that, although the Ecuadorian institutional variables show resilience in 2017, they do not manage to recover but decline again until 2019. And one element to be widely debated is how that same critical juncture correlates negatively with the egalitarian variety, because this contradicts one of the democratic principles that indicates that for there to be full democracy all citizens must be equal. In any case, Ecuadorian electoral democracy shows a positive correlation with high levels of inequality, and although the same critical juncture managed to reduce this structural variable until 2016, there seems to be another "path dependency" that drags high levels of inequality among Ecuadorian citizens, and in the face of this reality it seems that the resilience to generate equality is not good in the case of Ecuador since 2017.

Finally, it only remains to reiterate the relationships previously established in the literature of sociology and political science with respect to institutional variables. Electoral democracy correlates very well with the balance of state powers, as well as with political alternation, which are the foundations of democracy institutionally understood. While radical elites (both on the right and on the left) along with the ruling party's control of parliament (an indicator against the balance of powers) correlate positively with the egalitarian variety of democracy. These observations are valid for the global period of decline from 2009 to 2019, and the interaction with the variables of social reality was previously described period by period of government. In this exploratory research, the values of the years after 2019 were not taken because the Covid_19 generate values that are too extreme, however, an exploration of other multivariate techniques to solve this dilemma is still pending.

Conclusion

The actors show a high explanatory power of the changes in social processes linked to the democratic decline of the Ecuadorian case, in the period 2009-2019, this statement is valid with the results obtained with the multivariate techniques Statis and Co-inertia, although the first shows better quality of shared variance explained expressed by Escoufier's Rv coefficient. Likewise, both techniques characterize very well the electoral democratic variety of the period prior to the democratic decline: 1996-2006. The years 2007 and 2008 represent a critical juncture that would have formed a "path dependency" that motivated the decline of electoral democracy, but at the same time the increase of values in the egalitarian democratic variety, which shows that these two varieties are inversely correlated in the Ecuadorian case, while there is no statistically significant information to establish a relationship with the participatory democratic variety. Regarding the latter, it is necessary to check whether it is directly related to the critical juncture of 2007 and 2008, although it could be related to variables not considered in this exploratory work.

The variable of the actors directly related to the democratic decline is the radicalism of the parliamentary elites, while the institutional variable related to this process is most of the legislators of the president's party in parliament; This set of variables is contrary to the institutional variable of the balance of powers and to the variable of the actors of political alternation.
On the other hand, the variable of the actors that is related to the increase of egalitarian democracy is the radicalism of the parliamentary elites, and it is also related to the increase in the Human Development Index, which coincides with the theoretical notion of equality, although this last statement is more valid for the period 2009-2012 than for 2003-2016. In the latter, data on external debt and international cooperation begin to take on more importance, and these last two structural variables are highly explanatory in the 2017-2019 period.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

Acknowledgements or Notes

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The Role of Human Choices in the Learning Process

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Abstract: Human decision-making plays a crucial role in the learning process, affecting engagement, motivation, information processing, and social interactions. Learners have the autonomy to select materials, study times, and strategies that suit their preferences and strengths. When faced with complex concepts, learners make cognitive choices that impact their understanding and knowledge application. Additionally, in collaborative settings, learners actively decide when and how to seek help and engage with peers.Understanding the significance of human choices in learning has important implications for educators and instructional designers. By fostering a supportive environment that encourages autonomy, active decision-making, and collaboration, educators can empower learners to take charge of their learning journey and improve outcomes.In conclusion, human choices shape the learning process, influencing engagement, motivation, information processing, and social interactions. Acknowledging and harnessing the power of decision-making can enhance educational practices and empower learners to become active agents in their learning journey.

Keywords: Learning process, Decision-making, Human, Human choices

Introduction

Gender equality and equal opportunities are important topics in today's society. Within the corporate environment, the issue of gender equality between women and men is receiving increasing attention, and companies are increasingly striving to provide women with equal opportunities in leadership positions and other key decision-making roles. However, there are still many areas where women are underrepresented in leadership positions and find it challenging to have a say in decision-making processes.

The research I conducted aimed to examine how decision-making processes and preferences differ between women and men both within and beyond the corporate environment. The chosen studies utilized various methods, such as online surveys, observations, and interviews. By involving women and men working in the corporate setting, I collected information on their decision-making processes, preferences, and challenges. Through analysis, I looked for patterns and differences that could help understand the gender-related disparities in decision-making. Understanding the findings of these studies can be advantageous for companies as it enables a better comprehension of the gender-based decision-making differences. This understanding can aid in providing equal opportunities for both women and men in decision-making, thus promoting gender equality in the corporate environment. Empowering women to be more effective participants in corporate decision-making can contribute to creating a more equitable and inclusive business setting.

Literature Review

The Impact of Emotional Factors on Decision-Making

Emotions and emotional traits hold a central place in the stereotypes associated with "typical" women and men. Most psychological research exploring the relationship between gender and emotions focuses on when and why emotional differences between genders occur. Beliefs about emotions and behavioral gender differences are

often context-dependent, meaning that the extent of differences depends on the area of study and how the research context is framed. (Kim, 2010) These are also significantly influenced by generational differences and characteristics, mainly due to the impact of digitalisation and innovation. (Csiszárik-Kocsir &Varga, 2023a, 2023b; Csiszárik-Kocsir & Dobos, 2022, 2023; Dobos et al., 2022; Mizser et al., 2022; Garai-Fodor et al., 2022a).

It is evident even from our everyday lives that emotional factors play a crucial role in decision-making for both women and men. However, as research from recent decades indicates, the influence of emotional factors on decision-making can vary between the two genders. Women tend to listen to their emotions more during decision-making. This is attributed to women generally being more open about expressing their emotions and being more inclined to consider their feelings and intuitions when making decisions. These factors can significantly impact the choices women make and how they respond to events in their surroundings. As a result, emotional influences can heavily affect women's decisions and often influence their overall quality of life and workplace performance. (Eagly, 1990).

For men, the impact of emotional factors is generally smaller, and they are often more inclined to approach decision-making rationally and logically. They tend to favor decisions supported by facts and data and are less prone to emotional influence. However, research shows that emotions can still play a role in men's decision-making, especially when it comes to significant life choices, such as career or family-related decisions.

It's important to note that the impact of emotional factors on decision-making is not necessarily negative. Emotions can assist individuals in making the most appropriate decisions for a given situation, and considering them during business decision-making can be advantageous. (Fodor et al., 2022).This chapter discusses the gender differences in various aspects of emotions and future directions for studying the relationship between gender and emotions. (Fodor, 2023).

Differences and Context

It's crucial to create various contexts to observe gender-related emotional differences adequately. Factors influencing gender differences include:
a) whether the observed behavior occurs publicly;
b) whether the behavior is identified as "feminine" – for example, an activity that girls or women are generally good at;
c) asking about retrospective events/behaviors.

For example, in reports about experiencing emotions, gender effects more closely resemble gender stereotypes when individuals recall their behavior and emotions afterward than when emotion reports are in real-time. For instance, when asking women and men about their ability to empathize with others, women generally report higher levels of empathy than men. However, this difference decreases or disappears when measuring empathic behavior in an actual situation. (Goboly & Foldi, 2022).

Reactions to Emotional Factors for Women and Men

Women and men can exhibit different emotional reactions. In general, women pay more attention to their emotions and attach greater significance to them during decision-making compared to men. Men tend to seek more rational solutions and are more likely to engage in logical analysis rather than emotional reactions. This difference can impact decision-making. Women are more likely to prioritize emotional considerations and may take longer to make decisions when they are unsure about the correctness of their self-posed questions. As a result, they often spend more time on decision-making and are more thorough in making these decision.(Csiszárik-Kocsír & Garai-Fodor, 2018).

Men, on the other hand, are generally quicker to make determinations and are more likely to consider logic and facts over emotional reactions. This often results in faster and more decisive decisions compared to women.
However, research suggests that when emotional factors play a crucial role in decision-making, women generally outperform men, particularly in decisions that significantly affect their lives, such as career or family-related choices. These reactions are important when facing choices that impact their future, life, and happiness. Additionally, sentimentality is particularly significant in the business world, where decisions often involve

financial risks. Studies show that female leaders tend to perform better in emotional intelligence than men, and this can help them manage risks and conflicts more effectively. (Csapó et al., 2018)

Emotional Intelligence

Emotional intelligence (EI) has proven to be a relevant construct in various aspects of everyday life, including mental and physical health, social functioning, as well as academic and workplace performance. Numerous studies have explored the mechanisms through which EI operates in individuals. However, several authors have also analyzed the differences in emotional abilities based on sociodemographic variables such as gender, ethnic background, age, and socio-economic or educational attainment. (Fodor, 2022).

Traditionally, the emotional dimension of human beings is more associated with the female gender, as they tend to experience positive and negative emotions more intensely than men. The biological explanation suggests that women's biochemistry is more prepared to consider their own and others' emotions as crucial elements for survival. This is supported by the idea that specific areas of the brain dedicated to emotional processing may be larger in women than in men, and the processing of emotions may be more extensive. Emotional differences between genders are influenced by numerous factors, including culture and socialization. For example, emotional expressions may differ between genders, and women generally have more opportunities to practice and develop their emotional intelligence in emotional situations. On the other hand, Baron-Cohen's "extreme male brain theory of autism" relies on biological and social arguments, suggesting that male and female brains have different structures. According to this theory, the female brain is largely built around empathy, while the male brain is more focused on understanding and constructing systems. Baron-Cohen argues that the cognitive and behavioral systems of men and women functionally differ from each other. (Garai-Fodor et al., 2022b). A study on emotional intelligence tested a total of 267 university students (156 female, 111 male) in exchange for course credit. The participants' ages ranged from 18 to 50 years (average = 20.02, SD = 3.60). Among the participants, 56.9% were Caucasian, 13.1% were Spanish, 12.4% were Asian, 8.2% were African-American, 5.6% were Pacific Islander, and 3.4% were from other ethnic backgrounds.

The test is based on emotional intelligence as a combination of skills, including recognizing and understanding emotions, managing and regulating emotions, and using emotions in communication and problem-solving. The MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test) consists of four branches:(Szemere et al., 2022) Identifying Emotions: Participants have to interpret emotion expressions in given situations, such as faces, voices, or words. (Baranyi et al., 2022).

Perceiving Emotions: Participants have to recognize emotional states in others through their facial expressions, voices, or words.

Using Emotions: Participants have to use emotional information in various situations, such as problem-solving or communication. (Foldi, 2015). Managing Emotions: Participants have to regulate emotional states, such as reducing stress or anger.

Table 1. Sex differences for the MSCEIT distribution

Branch	Sex	Mean	Standard Deviation	Effect size	Comparing Means
Perceiving	Male	97.08	14.76		
	Female	99.68	16.40	-.17	$t(265) = 1.33, p = .184$
Using	Male	91.80	18.91		
	Female	95.12	17.58	-.18	$t(265) = 1.48, p = .141$
Understanding	Male	85.02	14.18		
	Female	90.36	13.95	-.38	$t(265) = 3.06, p = .002$
Managing	Male	85.46	13.82		
	Female	90.46	15.23	-.34	$t(265) = 2.75, p = .006$

Note. Effect size = mean difference / standard deviation.
$^{*}p < .05$. $^{**}p < .001$.

The scoring of MSCEIT is done with consensus-based scoring, meaning that participants' scores are based on the percentage of normative group respondents who provided the same response. For example, if 55% of the normative group chose option C, a participant would receive a score of 0.55 for selecting that option.(Csiszárik-Kocsír & Garai-Fodor, 2018). Women scored higher in all branches of MSCEIT than men. However, these

differences were only significant in two branches: understanding and managing emotions. (Foldi & Medveczky, 2017). Although women scored higher in all four sections of the test than men, only two of them showed significant differences.

Social Pressure

The leadership role can often be more challenging for women due to societal expectations. The dominance of men in the workforce and politics remains strong, which can be disadvantageous for women. Women leaders often face the social expectation to be assertive and confident while also being caring and nurturing mothers and wives. As a result, women often struggle to find a balance, and it is not uncommon for them to feel torn between work and personal life. (Garai-Fodor, 2022).

Men's leadership role is not immune to societal pressures either. Men are generally expected to be confident and assertive and be able to lead and control. However, these stereotypical roles can lead men to suppress their emotions and present a tougher, stronger exterior. This can lead to emotional exhaustion and mental health problems. (Pervez et al., 2022).

In addition to societal pressures, it is essential for both women and men to consider individual goals and values to be truly content and happy in their leadership roles. Emphasizing acceptance that everyone has their unique style and that women and men can learn from each other strengthens the leadership culture and promotes diversity in workplaces.(Csiszárik-Kocsír & Garai-Fodor, 2018).

Material and Methods

In the context of social pressures and how they affect women and men regarding societal expectations, I conducted a questionnaire, the results of which are presented below.

The survey included 324 female and 84 male participants. Among them, 65% fell within the age range of 18 to 35, with the remaining percentage distributed across older and younger age groups. The questionnaire encompassed various aspects of societal pressures on women, revealing that 80% of female respondents felt under high pressure, while only 20% indicated experiencing low or moderate pressure. Notably, 70% of women believed that the media and advertising significantly influenced the societal standards of female beauty.

Conversely, the assessment of societal pressure on men demonstrated more diverse perspectives. Among male participants, 55% perceived the pressure as moderate, while 15% believed it to be very strong. In contrast, 30% of male respondents stated that they experienced low or negligible pressure. Moreover, 40% of men acknowledged the impact of media and advertising on the male ideal of beauty.

An intriguing finding was that 70% of all respondents believed their lives were significantly influenced by trends, social media, and beauty ideals. Among this group, 30% expressed feeling these influences strongly, while 40% considered the effects to be relatively mild. On the other hand, 20% of respondents reported experiencing minimal presence of social pressures, and 10% claimed not to feel these influences at all.

This data sheds light on the complexity of societal expectations, particularly concerning gender roles and beauty standards, and how individuals perceive and respond to these pressures. However, it is essential to continue researching and understanding the multifaceted nature of these issues to foster more inclusive and supportive environments for all individuals.

The questionnaire aimed to identify potential strategies to counteract and mitigate the impact of these societal pressures in today's world, encompassing both social media and traditional media, as well as fundamental human values.

Regrettably, in contemporary society, it has become quite common for celebrity 'influencers' to utilize their popularity not to challenge or alleviate social expectations and ideals, but rather to reinforce them. This phenomenon manifests in women's pictures or videos showcasing the pursuit of a flawless physique, a picture-perfect face, and conforming to feminine stereotypes imposed by society. Similarly, men are often portrayed adhering to narrow definitions of masculinity. However, there is considerable speculation on how to shift this narrative towards a more inclusive and accepting direction.

To address these challenges, several key approaches and possibilities emerged from the questionnaire. First and foremost, fostering media literacy and critical thinking skills is essential. By empowering individuals to discern between authentic content and unrealistic portrayals, we can reduce the harmful influence of media on body image and societal expectations. Promoting diverse representations of beauty and dismantling stereotypes can lead to a more accepting and inclusive culture that celebrates individuality.

Another vital aspect that participants highlighted is the need for positive role models and influencers who actively challenge societal norms and advocate for self-acceptance. Encouraging individuals who embrace their uniqueness and advocate for body positivity and gender equality can inspire others to do the same. Additionally, encouraging open conversations about these issues in various social settings, such as schools, workplaces, and families, can create safe spaces for individuals to express their struggles and seek support. By reducing the stigma around mental health and body image discussions, we can promote a healthier dialogue and understanding of these challenges.Furthermore, promoting self-compassion and nurturing a healthy relationship with oneself is vital. Emphasizing the importance of intrinsic values, such as kindness, empathy, and personal growth, can counterbalance the emphasis on external appearances and societal validation. To effect broader change, media outlets and platforms should take on greater responsibility in promoting positive content and discouraging harmful narratives that perpetuate unrealistic standards. Encouraging advertisers to diversify their representations and avoiding the use of overly edited images can contribute to more authentic and inclusive media portrayals.

In conclusion, while societal pressures and narrow beauty ideals are pervasive in today's world, the questionnaire revealed hopeful possibilities for change. By fostering media literacy, embracing diverse representations, encouraging positive role models, facilitating open conversations, and promoting self-compassion, we can pave the way for a more inclusive and accepting society that embraces the uniqueness of every individual.

As per the respondents' feedback, a significant portion (45%) highlighted the need for increased awareness and education regarding gender stereotypes. They emphasized the importance of providing this education from an early age, which can be facilitated by parents, schools, and other educational institutions. Additionally, the importance of addressing gender stereotypes among older generations, who might have grown up in environments where challenging such norms was discouraged, was emphasized.

The workplace emerged as a crucial arena for promoting awareness and combating gender expectations, as these stereotypes often influence job positions and pay discrepancies. Respondents stressed the significance of creating a more inclusive work environment by fostering flexibility in expectations and offering equal opportunities for both women and men. While it may be challenging to completely eradicate societal expectations, the consensus among respondents was to make dedicated efforts to alleviate them and create a more equitable society.

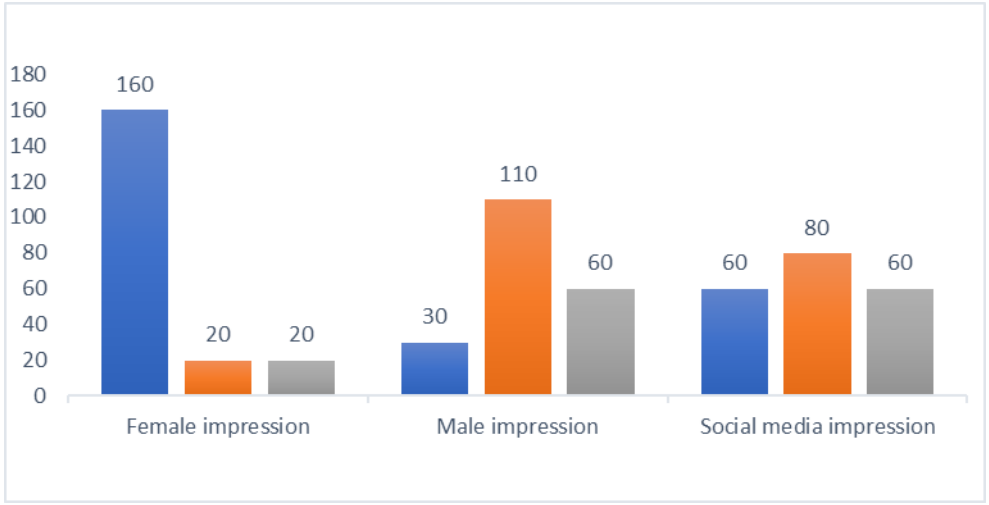

Figure 1. Percentage of responses to the questionnaire

Strengthening self-esteem and self-confidence was deemed vital by 20% of both genders. Respondents recognized that societal pressures to conform to gender expectations can lead to a lack of confidence and self-esteem issues. This aspect is particularly relevant for individuals who are still forming their self-image, such as

teenagers and young adults. To complement these suggestions, the respondents also proposed implementing mentorship and support programs that empower individuals to navigate and challenge gender norms. Having role models and mentors who have overcome similar challenges can be inspiring and provide invaluable guidance.Furthermore, incorporating diverse perspectives and representations in media, advertising, and other public platforms was seen as essential to combat gender stereotypes. By showcasing a wide range of role models and success stories, society can challenge rigid gender norms and promote inclusivity. Moreover, the importance of engaging men as allies in the fight against gender expectations was highlighted. Addressing gender stereotypes and promoting equality should be seen as a collective effort, involving both men and women working together to create positive change.

In conclusion, the respondents' insights underscore the significance of awareness, education, flexibility in expectations, self-esteem building, mentorship, and inclusivity in combating and mitigating the influence of gender stereotypes. By implementing these strategies in various aspects of society, we can move towards a more equitable and accepting world, free from the constraints of narrow gender expectations.

These findings hold significant importance in understanding the factors influencing decision-making among women and men. The results suggest that women might face a certain disadvantage, given that a substantial proportion of respondents reported their lives being more affected by societal pressures. While men may experience a slightly higher sense of freedom in this regard, they are not immune to these pressures either. However, it is evident that gender stereotypes have a notable impact on their positions in the workplace and career progression, potentially even more so than for women.

The gender disparities reflected in the survey highlight the need for further exploration and targeted efforts to address these challenges. One possible explanation for women facing a greater impact could be the enduring prevalence of traditional gender roles and expectations in society. From a young age, girls and boys may be exposed to different societal norms, leading to contrasting experiences and perceptions when it comes to decision-making and life choices.

To promote gender equality and empower women, it is crucial to foster an environment that challenges traditional stereotypes and offers equal opportunities for personal and professional growth. Encouraging girls and young women to pursue careers in male-dominated fields and providing mentorship and support can help break down the barriers that hinder their progress.

Similarly, men's experiences with societal pressures also warrant attention. Despite enjoying relatively more freedom in certain aspects, they might encounter rigid expectations surrounding masculinity, emotional expression, and career trajectories. Encouraging open discussions about male experiences, emotions, and vulnerabilities can contribute to healthier and more authentic expressions of masculinity.

Efforts to dismantle gender stereotypes in the workplace should be a priority for creating a level playing field. This involves promoting inclusive policies, pay equity, and diversity in leadership positions. Additionally, fostering a culture of empathy, respect, and sensitivity in the workplace can help combat harmful gender expectations. Educational institutions and media outlets play a vital role in shaping societal norms and perceptions. By incorporating diverse and inclusive content in educational curricula and media representation, we can challenge stereotypes and promote acceptance. Moreover, engaging men as allies in the fight for gender equality is essential. Emphasizing that gender equality benefits everyone in society can lead to broader support and cooperation in challenging harmful norms.

In conclusion, the survey results shed light on the different ways societal pressures influence decision-making among women and men. By acknowledging these disparities and working collectively to challenge gender stereotypes and promote equality, we can create a more equitable and empowering society for all.

Conclusion

Studies have shown that female leaders generally exhibit a more cooperative and collaborative approach, while male leaders tend to be more individualistic and competitive. Women are inclined towards risk aversion and attention to detail, whereas men often focus on assertiveness and quicker decision-making abilities. However, it is essential to emphasize that these differences do not necessarily confer advantages or disadvantages to either women or men. Leaders must adapt to the circumstances and specific situations to make the best decisions.

The results indicate that societal expectations and stereotypes significantly influence decision-making, particularly in leadership positions. Often, individuals make their decisions based on societal norms and expectations associated with their gender. For instance, there is often an expectation for women to be "attentive" and "sensitive," which can reinforce their inclination towards cooperation and attention to detail. On the other hand, men might feel pressure to be "decisive" and "competitive," reinforcing individualism and quick decision-making. However, leaders must be capable of breaking free from these stereotypes and finding a balance between different leadership styles and approaches. It is crucial that leaders base their decisions not on gender-associated stereotypes but on the specific context, the needs of the team, and the goals at hand. Promoting equality and inclusivity is also a crucial goal in leadership. Both women and men should have equal opportunities to demonstrate their leadership abilities and styles. Societal expectations should be shaped to support and foster diversity and various leadership approaches.

In conclusion, recognizing and understanding the gender differences in decision-making is an important step towards developing inclusive leadership practices and promoting equality. Empathy, open communication, and critical examination of societal norms can contribute to ensuring that leaders make the best decisions possible, regardless of their gender.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

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