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About the Journal

Journal of Educational Technology and Online Learning (JETOL) is an international, refereed, open access e-journal. The Journal targets both researchers and practitioners of educational technology and online learning fields. JETOL has been being published triannual, in January, May, and September. JETOL is currently indexed by Ebsco Host, ProQuest, Index Copernicus, Cite Factor, COSMOS IF, BASE (Bielefeld Academic Search Engine, Google Scholar, LOCKSS, Open- J Gate, International Institute of Organized Research (I2or), Eurasian Scientific Journal Index (ESJI), Directory of Research Journals Indexing (DRJI), ResearchBib, Rootindexing, ROAD, Rootindexing.

Editorial Board

Table of Contents

From the Editors

Dear JETOL readers,

It has been an amazing journey throughout the last two years. We published our first issue in 2018 and after two volumes and six issues, we are dedicated to work more to contribute to universal knowledge. We adopted and open and flexible approach; therefore, we are a referred, open access journal and we are proud that. JETOL aimed to disseminate original research, theory, and best practice on educational technology and online learning.

Including our new issue, the advent of 2020 brought many things. Educational technology is widely accepted, and it is a need than a plausible option for effective and efficient learning processes. There are many exciting developments in educational disciplines. There is more awareness on OER and OEP, MOOC model has been mainstreaming, AI technology promising exciting opportunities, and many initiatives with noble values have been launched. However, we don't defend a technology centric view and we consider that learning and learner centered approaches are our core values. We would like to highlight that, as the Journal of Educational technology and Online Learning (JETOL), we believe in the ideas learning with technology, not learn from technology.

In our third year, we also would like to state that we will accept opinion and position papers that rises critical questions. Please, consider JETOL for such papers for the future issues. As a final remark, methodology, no matter which paradigm, is significant and authors that submit papers should clearly articulate the method, research model or design, data collection tools and analysis procedures.

In our third age, in other words, third volume and first issue, we introduce a wide array of articles. We would like to thank to all authors and reviewers who contributed to the advancement of scientific knowledge and to the field of educational technology and online learning.

In our third year, we worked hard and gained a great momentum and indexed in different databases: EbscoHost, ProQuest, Index Copernicus, Cite Factor, COSMOS IF, BASE (Bielefeld Academic Search Engine, Google Scholar, LOCKSS, Open- J Gate, International Institute of Organized Research (I2or), Eurasian Scientific Journal Index (ESJI), Directory of Research Journals Indexing (DRJI), ResearchBib, Rootindexing, ROAD, Rootindexing. We hope that JETOL will continue to be a premier source for those who seek and pursuit knowledge.

In the first issue of 2020, we have **6** articles. The first article, written by Yunus Emre AVCU & Kemal Oğuz ER, is entitled "**Design Thinking Applications in Teaching Programming to Gifted Students**." The second article, by Usame Omer OSMANOGLU, Osman Nuri ATAK, Kerim CAGLAR, Hüseyin KAYHAN & Talat Cemre CAN, is entitled "**Sentiment Analysis for Distance Education Course Materials: A Machine Learning Approach**." The third article, by Ramashego Shila Shorty MPHAHLELE & Matlala Violet MAKOKOTLELA, is entitled "**Discourse on student participation in the Open Distance Learning using Open Educational Resources**." The fourth article, by Burak YILMAZSOY, Mehmet KAHRAMAN & Utku KÖSE, is entitled "**Negative Aspects of Using Social Networks in Education: A Brief Review on WhatsApp Example**." The fifth article, written by Emily NG, is entitled "**Successful implementation of E-learning in self-financed Higher Education: Experience from Hong Kong**." The sixth and final article, by Gönül ÖZSARI & Abdullah SAYKILI, is entitled "**Mobile Learning in Turkey: Trends, Potentials and Challenges**."

We hope and believe that, as an open access journal, we will move forward and contribute the universal knowledge ecology.

Yours respectfully,

Dr. Gürhan Durak

Dr. Aras Bozkurt

Editors in Chief

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Design Thinking Applications in Teaching Programming to Gifted Students

Yunus Emre Avcu[a]
Kemal Oğuz Er[b]

[a] yunus1099@hotmail.com; Şehit Prof. Dr. İlhan Varank Science and Art Center, Balıkesir, Turkey; ORCID: 0000-0001-8286-0837
[b] keoguzer@gmail.com, Balıkesir University, Balıkesir, Turkey; ORCID: 0000-0001-6098-2067

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Research Article

Abstract

The study aimed to present suggestions for how a design thinking (DT) approach can be applied in the processes of teaching programming to gifted students and to reveal its effects on the teaching process. The case study method was used. 5 different DT tasks were defined to create solutions for an unstructured problem by using programming tools and DT processes. DT activities were applied to 25 gifted students (13 girls, 12 boys) at the Science and Art Center (BİLSEM) in the city center through the summer term. Data were collected through interviews, observation forms, and the DT Rubric which was developed by the researchers. The findings showed that gifted students improved their DT skills to a certain level, learned the academic content, enjoyed the process itself, and experienced some problems working in teams. At the end of the teaching process, the students emphasized that a good designer should be a respectful person who can work well within a team. Additionally, according to the students' views, different programming tools and environments namely Scratch, Arduino IDE and Lego Mindstorms EV3 can be used in the prototyping phase of the DT processes. Updating DT tasks to include DT mindsets and taking into account the leadership qualities of gifted students during the implementation process may be suggested.

Keywords: design thinking, differentiation, gifted student, programming, activity design.

1. INTRODUCTION

Gifted students are those who perform at a higher level than their peers in at least one of the following areas: academic areas such as general cognitive skills, mathematics, and science; psychomotor skill areas; creativity; leadership; and/or visual or performance-based art (Clark, 2015; Marland Report, 1972; Ministry of National Education [MoNE], 2018; National Association for Gifted Children, 2019). According to Renzulli (1978), there are three sets of features that define gifted individuals, namely general and special talent, motivation (devotion to the task), and creativity. It is an obligation rather than a responsibility to provide this elite group of people who perform or have the potential to perform better than their peers with education services that they need and will be able to develop their talents in (Öngöz & Sözel, 2018).

Strategies of grouping, acceleration, and enrichment are used in gifted student education. Gifted students have the chance to work with students who possess similar characteristics to them by applications of grouping (Kanlı, 2008). The leading role in the education of gifted students in Turkey belongs to the Science and Art Centers (BİLSEM) and their grouping samples (Ataman, 2004). The scope of acceleration activities includes practices such as, class skipping, early school entry, participation in upper classes in a specific area or areas, and narrowing the curriculum (Gür, 2017; VanTassel-Baska & Brown, 2000). The range of educational programs will be extended for enrichment purposes and students will be given the opportunity to focus on specialized topics and activities (Sak, 2014). Some examples of enrichment are a teacher inviting a person who is a specialist in a certain area to class in order to provide students with in-depth information, or a teacher giving research articles to students which are not a part of the current curriculum (Şahin, 2015a).

The concept of differentiation is used as an umbrella concept which covers all grouping, acceleration and enrichment strategies in the education of gifted individuals. Differentiation is a learning experience where distinct ways to explore the curriculum is used to enable students to understand the material, the teaching process and activities are coordinated in a way that allows students to make substantive learning and construct the knowledge, and choices are presented to students to allow them to show what they have learned in different ways (Tomlinson, 1995). In other words, to meet the learning needs of students who have different learning skills, interests, and readiness levels, differentiation can be applied to an education program's content, process, environment and product dimensions (Tortop, 2015). Taking into account the students' interests, learning styles and prior knowledge, the content can be differentiated. The learning environment can be differentiated in terms of material, time and space. The process dimension is influenced by the paths and methods students use in thinking and using information while participating in the learning process. Differentiation can be realized in the process dimension in terms of strategy, system, methodology, high-level thought, research, self-expression, and self-regulation skills. The product can be differentiated according to criteria such as depth, originality, unusualness, innovation, and is related to the real world (Şahin, 2015b, 2018a, 2018b).

Gifted education researchers have been working on creating models regarding the differentiation of content, environment, process and product dimensions such as "Future Problem Solving" (Treffinger, Jackson & Jensen, 1996), "Creative Problem Solving" (Maker

& Schiever, 2005), "Thinking Actively in a Social Context" (Wallace, Cave, & Berry, 2009), "Problem Based Learning" and "DISCOVER" (Maker & Pease, 2008) for many years. By applying these models, it is aimed that gifted students will find creative solutions to unstructured problems in a social context that is close to them, and they will develop high- level thinking and metacognitive skills (Alhusaini, 2018). Design thinking is one of the models that serve to the aforementioned targets.

Design thinking is a human-centered approach that aims to find creative and innovative solutions to various social and commercial problems by using design tools and mindsets (Kelley & Kelley, 2013, Lor, 2016). During the process of design thinking, learners work on targets that are not clearly defined and unstructured problems that have no solutions stated yet (Jonassen, 2000). The effectiveness in bringing 21st-century skills and characteristics to students creates the educational value of design problems (Koh, Chai, Wong & Hong, 2015). The design thinking process relies on the principles of empathizing in order to understand user needs, defining the needs, making trials, prototyping, receiving feedback from users, redesigning the process (Darbellay, Moody & Lubart, 2017) and expressing yourself through creative ways besides using words and symbols (Brown & Wyat, 2010). Since there is no common description of design thinking in literature, there is no single way to follow the design thinking process. Institutions such as Stanford University Hasso Plattner Design School, IDEO and Design Council have developed many design process models. In all models; collecting information in order to understand the problem, using creative thinking skills in the process and being experiential during the process were always highlighted (Chesson, 2017). "D.school" describes the design thinking process phases as empathizing, defining, brainstorming (ideate), prototyping, and testing, respectively (Bootcamp Bootleg D.School, 2011). The design thinking process is a iterative process, and phases can be repeated one after the other if needed (Lor, 2016). In Figure 1, the stages of the design thinking process and their relations with each other are shared.

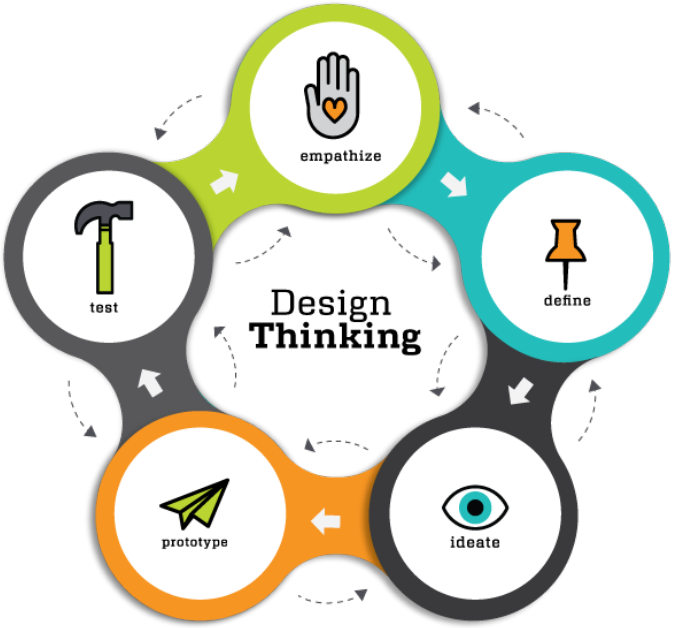


Figure 1. Design Thinking Process

Source: Ideate High Academy (2019)

The design thinking process starts with empathizing with the user. Insights of what people feel and what people think will be developed through empathy (Carroll, 2015). In order to develop insights, students observe how people behave, and how they interact with other people and the environment. Also, they can record projections regarding the answers to questions asked. This way, empathy will be established with the user (Carroll et al., 2010). When students empathize, they are not limited by their own experiences. On the contrary, they can develop new ideas and products through internalizing others' experiences (Root-Bernstein & Root-Bernstein, 1999).

The second phase of design thinking is defining the need. In this phase, action-based problem statements will be stated after analyzing and synthesizing the data obtained during the empathy phase. Problem situations are expressed as Point of View (POV) statements which are formed by combining "User + User's Need + Insight" (Carroll et al., 2010). The problem defining phase supports creative thinking skills in the context of evaluating a situation or problem from different angles, redefining present models and enabling the production of new information by developing multiple points of view (Henriksen, Richardson & Metha, 2017).

Brainstorming is a phase aimed at producing many ideas in various categories devoted to finding a solution for the defined problem. Students can participate in brainstorming processes

in different groups or individually (Painter, 2018). In the Prototyping phase, a solid product is put together by taking action on the new ideas that were developed in the brainstorming phase. Any kind of thing that has a physical component such as an object, role-play activity, an interface, a visual scenario draft inherits the feature of being a prototype (Bootcamp Bootleg D.School, 2011; Carroll, 2015, Odabaşı, Dursun, Ersöz & Kılınç, 2018). In the testing phase, which is the final stage of the design thinking process, the user is able to experience the developed prototype and give feedback to the designers. Solutions developed according to user feedback are evaluated and will be improved accordingly (Carroll, 2015). Additionally in this phase, gathering more information about the user and the improvement of POV statements after testing can be realized (Bootcamp Bootleg D.School, 2011). All the actions executed by the designer or the designing team in the design thinking processes are supported by the individual's attitude and mindsets. These processes are effective on the qualification of design thinking (Carroll, 2015; Chesson, 2017; Lor, 2016). In literature, design thinking mindsets are stated as follows; people-oriented, action-oriented, metacognitive awareness, multidisciplinary understanding of cooperation, open-mindedness, tolerance to uncertainty, teamwork, risk-taking, learning-oriented, learning from mistakes/experiences, and creative self-confidence (Dosi, Rosati & Vignoli, 2018).

In literature, design thinking is generally considered to be a teaching method and skill set, and it has been proven that the design process has positive effects on students' academic learning, cognitive, affective and social skills. Students who experience the design thinking process have the opportunity to learn about the specialties of the designers, academic content, design process, teaching-mentoring knowledge and can improve their academic success. At the end of the design thinking process, learners develop creative thinking, critical thinking, problem- solving, design thinking, meaningful learning, and metacognitive skills. In the design thinking process, students have the opportunity to progress their affective skills such as empathy, creative self-confidence, risk-taking, assertiveness, self-sufficiency of knowledge generation, curiosity, being human-oriented and setting a career goal. Furthermore, social skills like working in cooperation, self-expression and having social interaction of learners can be improved during the design thinking process (Aflatoony, Wakkary & Neustaedter; 2018; Bouchard, 2013; Carroll et al., 2010; Carroll, 2015; Duman & Kayalı, 2017; Henriksen et al., 2017; Koh et al., 2015; Kwek, 2011; Noel & Liub, 2017; Scheer, Noweski & Meinel, 2011; Rauth, Köppen, Jobst & Meinel, 2010).

Design thinking can be applied in different contexts such as mathematics (Painter, 2018), graphic design (Duman & Kayalı, 2017), social sciences (Koh et al., 2015), STEM education (Carroll, 2014) and teacher education (Carroll, 2014; 2015; Odabaşı et al., 2018). One of those contexts is computer science education which aims at revealing the designer, developer and active participant characteristics of learners and which is addressed with works of developing solid products and software developing (Kert, 2018). During software development (in other words, the programming process), students understand the nature of unstructured problems by cooperative work, empathize, define problems, and establish, develop, and improve their program to find new, appropriate and useful solutions (Romero, Lepage & Lille, 2017).

Programming has been thought to the gifted students of primary, secondary and high schools in the Information Technologies and Software lesson at BİLSEM. In this scope, framework programs and activity books are prepared to be included the programming skills and served as a guide to the teachers who work at BİLSEM (MoNE, 2017). BİLSEM Information Technologies and Software Lesson Framework Program can be criticized for not having any differentiation strategy, and for designing activities as technology-oriented rather than pedagogical. Because technology-oriented learning-teaching processes that lack pedagogical aspects lead to inefficiency during programming education (Kert, 2018). It can be stated as a deficiency not to execute example activities in the teaching programs that are designed for the gifted students who are studying in groups by formal education (MoNE, 2019). Example activities designed for gifted students are a necessity for the BİLSEMs that are in the phase of restructuring (Ayverdi, 2018). Building and sharing activities with teachers, that utilize differentiation strategies for gifted students, eliminate pedagogical deficits, focus on accomplishments and provide meaningful learning experiences are incredibly important. In addition, designed activities should be evaluated by empirical researches (Plucker & Callahan, 2014).

In the scope of this study, design thinking is discussed as a differentiated teaching method and skillset and applied during programming education processes for gifted students. The aim of the study is to present how a design thinking approach can be applied in programming education and to reveal its effects on the teaching process.

2. METHODOLOGY

Research Design

The study examines how design thinking is applied during programming education processes for gifted students. As in-depth examination of the DT experiences of the gifted students is intended, case study, which is one of the qualitative research methods, was used. A case study is an in-depth description and analysis of a bounded system. A bounded system can be single person who is a case example of some phenomenon, a program, a group, an institution, a community, or a specific policy (Merriam, 2014).

Participants

Activities included 25 gifted students who studied at Science and Art Center (BİLSEM) in the city Centre for one summer period. The study group consisted of 13 male and 12 female students. At the time of the study, 8 of the students were in 5th grade, 7 of them were in 6th grade, 3 of them were in 7th grade and 7 of them were in 8th grade.

Data Collecting Tools

Design thinking worksheets (Empathy Map, POV statements, User Feedbacks), note sheets used in the brainstorming process and prototypes developed during the DT process were examined with DT Rubric (Annex-4) developed by the researchers. The steps proposed by Andrade (2000) and Mertler (2001) of DT Rubric were used. Firstly, 5 criteria were identified as performance criteria, evaluating each step of the design thinking process (empathy, defining, and brainstorming, developing prototypes, testing). Secondly, it was decided the type of DT rubric as to be "analytical rubric". To determine whether the students gained the DT skills while performing the DT tasks, not only the products they developed, affected this decision-making process. Afterwards, performance levels were determined and level definitions were cleared. Performance levels were determined from the weakest to the most competent by scoring the lowest level of performance as 1 and the highest level of performance as 4. After collecting the reviews of 8 gifted students, 1 teacher and 2 experts working on DT field, rubric was finalized. During the implementation of activities process, use of design thinking skills by gifted students is examined by DT Observation Form (Annex-5). The observation form was developed by researchers using the resources on the online platform "d school K12 Lab". Semi-structured interviews were conducted with gifted students before and after the implementation

of the activities. One student from each grade level (5th, 6th, 7th and 8th grades) participated in the interviews. In the interviews; questions such as how are they going to structure a design project, what kinds of tools they will use for prototyping, what they think about possible problems may be encountered during design process and what they think about the personality traits that a member of design team should inherit are directed to students.

Design of DT Activities

The activities in this study were designed to be used in information technology and software course for gifted students. There were five study units which covered block-based, text-based, physical and mobile programming, and at the end of each study unit, students were asked to develop unique projects according to the programming environment covered in each module. Prior to the project development process, the students received technical training regarding design thinking, block-based, text-based, physical, and mobile programming. The achievements of the activities are as follows:

1. Develop an original project in a block-based programming environment using design thinking process.
2. Develop an original project in a text-based programming environment by using design thinking process.
3. Develop original projects in a text-based physical programming environment using design thinking process.
4. Develop original projects in block-based physical programming environment by using design thinking process.
5. Develop an original project in mobile programming environment by using design thinking process.

For each achievement, "Design Thinking (DT) Tasks" were also determined which aimed to attract students' curiosity, increase participation in activities, and providing opportunities to demonstrate information processing skills also related with daily life as well. These tasks are stated as follows respectively; "redesigning the experience of playing computer games", "redesigning the healthy eating experience", "redesigning the experience of water use", "redesigning the experience of living safely" and "redesigning the learning experience in science and technology lesson". In all DT tasks; DT digital presentation, Empathy Map

Template (Annex-1), Point of View (POV) Template (Annex-2), User Feedback Template (Annex-3), Online Stopwatch Web 2.0 Tool, A4 papers, sticky note papers, color pencils and Ideate Cards were used. As for programming environments and physical programming tools; Scratch Block Based Programming Environment, Python Text Based Programming Environment, Ardunio Uno Ultimate Set and Arduino IDLE Text Based Physical Programming Environment, Lego Mindstorm EV3 Education Kits and Add-on Kits, Legomindstorms Education EV3 Teacher Edition Block Based Robot Programming Environment and App Inventor 2 Mobile Programming Environment were used.

Application Process

Each of the activities lasted six lesson hours and was administered to gifted students for one day at Science and Art Center (BİLSEM). Prior to the exercise, the Design Thinking process was reminded to the students by using a digital Design Thinking Presentation. After that, students were divided into 5 groups of 5 people. Students were given their DT task, Empathy Map, Point of View and User Feedback templates and other tools related to DT task. Students were required to name their group and hold a small discussion about the DT task. During the activities process, phases of the DT process were followed.

1. Execution Phase- Empathy

Students are told that their group is a "design team" and will work on the DT task. A volunteer in the design team is selected as "user". The other four people are called "designers". Designers will have an interview with the user to empathize. The task assignment is done by the designer students for the interview. Students take on the duties of 1) the main interviewer 2) the person asking continuity questions (such as "For what?" and "Why?") 3) note taker and 4) time keeper. Students are given time to prepare the interview questions (10 minutes) and to conduct the interview (25 minutes). To monitor timing "Online Stopwatch Web 2.0 Tool" is used and projected onto a screen visible to students. Students are expected to complete the empathy map within fifteen minutes at the end of the interviews. At the end of this process, one spokesperson from the groups is asked to briefly summarize the empathy map to the whole class, and revisions are given to the groups about their inferences on their empathy map. If needed, students make revisions on their empathy maps. An example interview questions prepared by students for the first DT task during the phase of empathy is shown in Figure 2, and the empathy map is shown in Figure 3.

When Figure 2 is examined, it is seen that students try to ask open-ended questions which may reveal user experiences, but they do not use continuity questions as much. When the empathy map showed in Figure 3 is examined, it is seen that the students place what they say and do in the left section of the template, and in the right section they make deductions according to the information they get from the user.

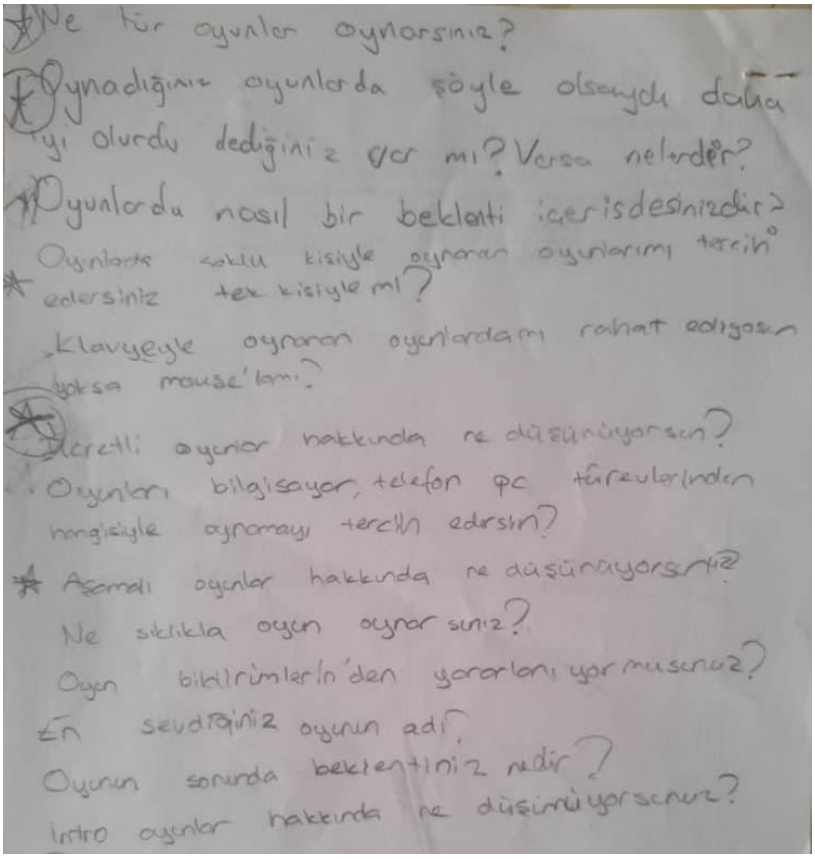


Figure 2. Example interview questions

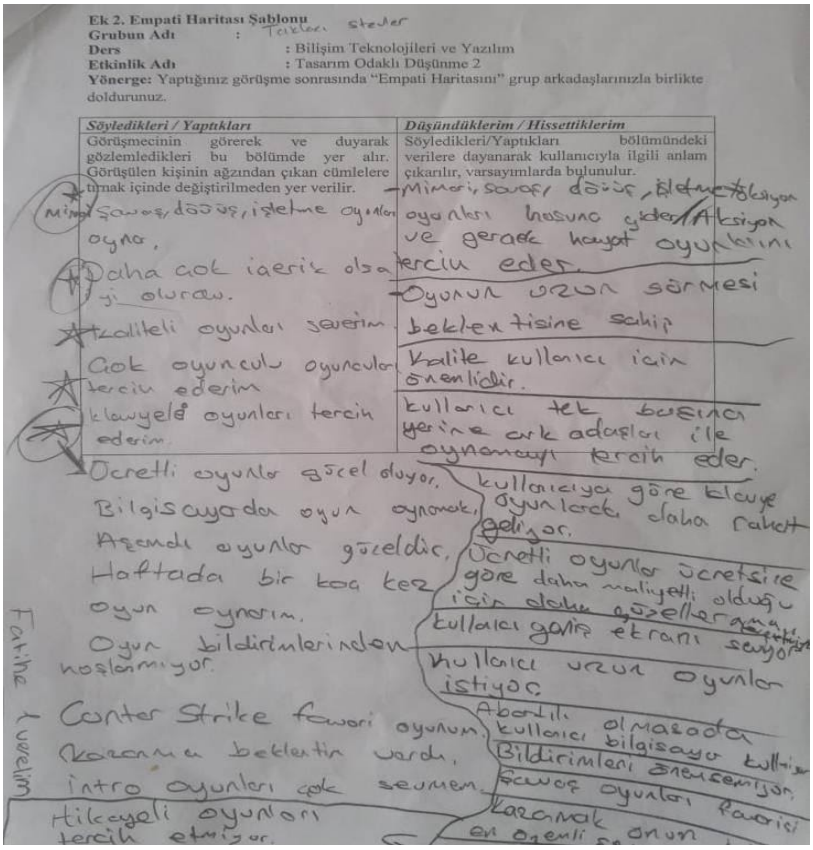


Figure 3. Example Empathy Map

2. Execution Phase –Defining

This is the phase where the problem or need is defined. Groups filled their POV worksheets in 15 minutes. In the Defining phase, students are asked to write down at least 3 POV statements. Each group is required to share POV statements to the class by one spokesperson and a discussion is held to check if the statements are correct POV statements. After that, students are asked to select one POV statement and proceed to the prototyping phase with that. When the POV template given in Figure 4 for the first DT task is examined, it is seen that the students write the user's need in the first part of the template by using verbs and in the second part they develop insight towards the need written in this statement.

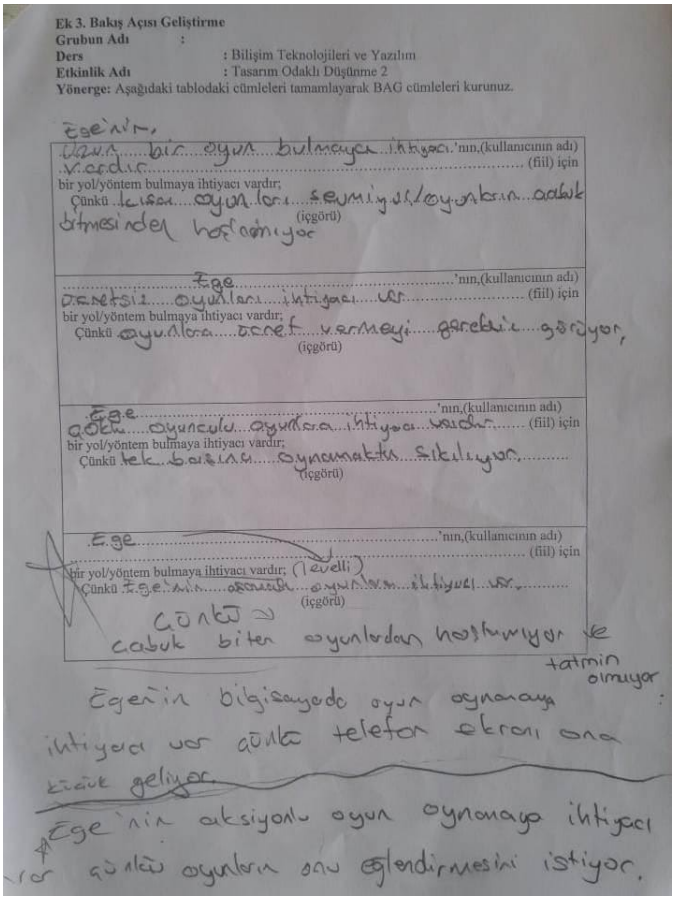
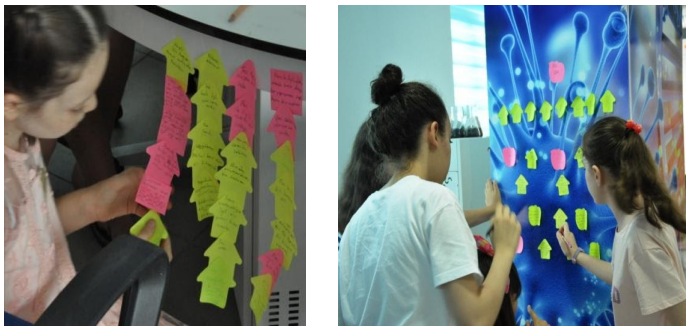


Figure 4. Example POV statements

3. Execution Phase- Brainstorming

After students write their POV statements, they do brainstorm to provide a solution for the need that presented itself in these statements. Before starting the brainstorming phase, students are reminded that they can develop each other's ideas (in their group), that ideas should not be judged, that the quantity of ideas is important, and that it is important for everyone to listen to each other's ideas. Students are given 10 minutes to produce at least 25 ideas. The students write down their ideas on sticky papers and cluster the papers in a dedicated area. Afterwards, if they wish to do so, students can cluster their ideas into categories. The images of the students' process of brainstorming are shared in Figure 5 (a, b). The activity leader(s) check whether the ideas that the students produce are solutions to the needs of the user and count the ideas. All members of the group which produced the most ideas receive a badge called “Ideate Card” by the activity leader(s). At the end of the brainstorming process, the group members put their signatures on

the 3 ideas they liked the most. Thus, the idea on the sticky paper with the most signatures is determined and prototype development phase starts.

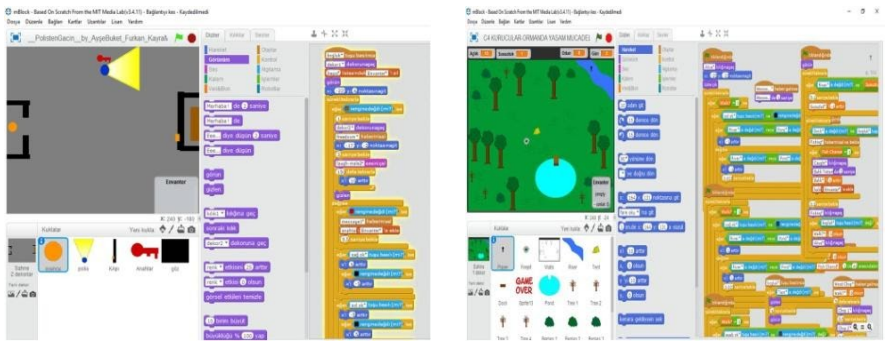


a **b**

Figure 5. Brainstorming process

4. Execution Phase -Prototyping

Students develop prototypes for their chosen ideas at this phase by using the appropriate programming environment as well as tools and materials that are suitable to the DT task given. The prototypes developed by students for the DT tasks are presented in Figure 6 (a, b), Figure 7, Figure 8 (a, b), Figure 9 (a, b) and Figure 10 (a, b).



a **b**

Figure 6. Example prototypes developed for 1st DT task

Figure 6 shows the prototypes developed by students in the Scratch block-based programming environment for the DT task. In Figure 6-a, a fast-progressive game was developed which has objectives and a story for the user. In this prototype, the user is imprisoned in a room. By using

directional keys to move, the user tries to get to the key without touching the police character. When the key is taken, the door of the room opens and the character becomes free. The group who designed the second game developed a survival game for their users. In this game, the user is hunting in a forest, collecting goods, building houses, lighting fire and so on to survive (6-b).

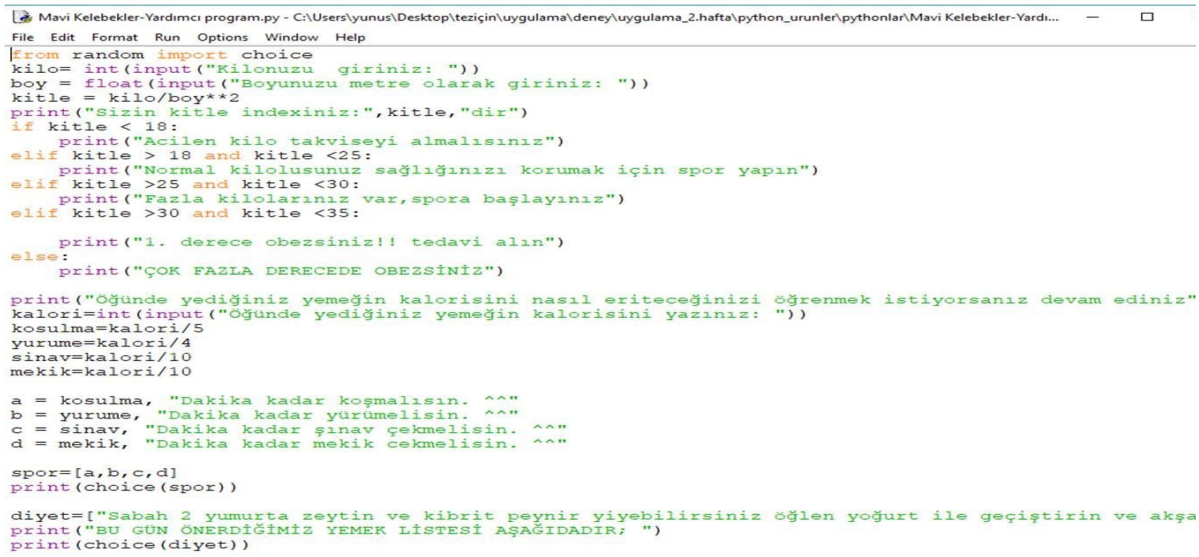


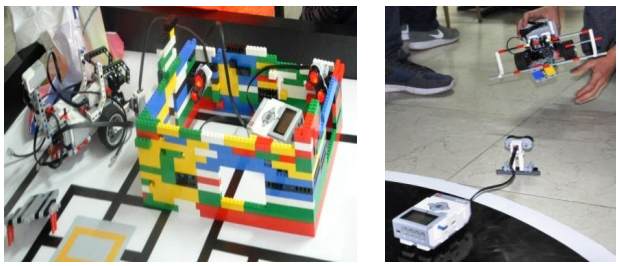
Figure 7. Example prototypes developed for 2nd DT task

Figure 7 shows the codes of the program that the students developed in Python programming language to redesign the healthy eating experience related to the second DT task. When the codes are examined, it can be seen that the user is asked to input their height and weight information. According to the information entered by the user, the program calculates the body mass index and returns feedback to the user. The user is then asked about the calories of the meal he or she eats for one meal course. According to this information, a suggestion is provided to the user regarding which sports to do and how long they should do it for in order to burn the target number of calories. A food menu is also offered to user.

a **b**

Figure 8. Example prototypes developed for 3rd DT task

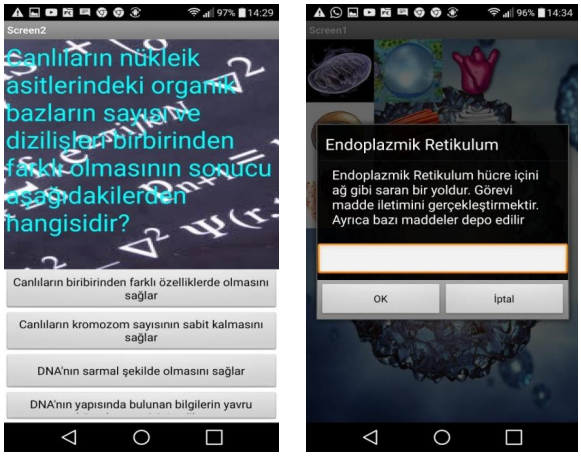
Figure 8-a shows that a prototype has been developed to prevent user's unnecessary plant watering. The soil moisture sensor is used to measure the moisture value of the plant soil and the user is informed if the plant is in need of water. In Figure 8-b, a system is developed for the user's concerns about possible water shortages in the future. If the tap is opened too much, the user is warned by sound. This system automatically switches itself off when the tap is left open thanks to the programmed timer and it can be integrated into any kind of tap (Figure 8-b).



a **b**

Figure 9. Example prototypes developed for 4th DT task

In Figure 9-a, a safe home system was developed, and in Figure 9-b, a robotic system was developed which can communicate with the police quickly using wireless technology in emergency situations.



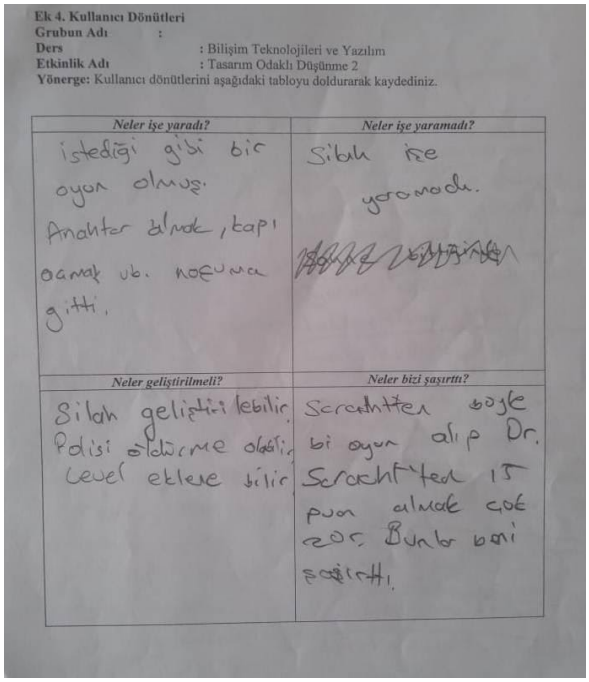
a **b**

Figure 10. Example prototypes developed for 5th DT task

In the first prototype, a mobile application was developed that asks the user questions about science and technology lesson contents when the user shakes the phone, and gives feedback to users regarding their answers (Figure 10-a). In the second prototype, an application was developed that asks the user to input functions of organelles in the cell, and after the user provides their answer, the app informs the user according to the information entered (Figure 10-b).

5. Execution Phase-Testing

In the testing phase, the developed prototype is presented to the user and the user's feedback is received. This process provides information regarding whether the developed prototype meets the needs of the user or not. In the testing phase, there are some rules that both the designers and users need to pay attention to. Designers are required to briefly explain their prototype without sharing details, and allow the user to interact with the prototype without interrupting. They observe user carefully. Users; express their views about the prototype clearly and in a straightforward way. They explain all of the details they liked and disliked, and they behave clearly and honestly in this process. Group records the feedback of users by using the User Feedback Template. After reviewing the feedback, they received and making revisions on the prototype, their work is presented to the user again, and then the final version of prototype is shared. Figure 11 presents an example of a user feedback template filled in for the 1st DT task.


Ek 4. Kullanıcı Dönütleri
Grubun Adı :
Ders : Bilişim Teknolojileri ve Yazılım
Etkinlik Adı : Tasarım Odaklı Düşünme 2
Yönerge: Kullanıcı dönütlerini aşağıdaki tabloyu doldurarak kaydediniz.

Neler işe yaradı?	Neler işe yaramadı?
istediği gibi bir oyun olmuş. Anahtar almak, kapı açmak vb. noktaya gitti.	Sibik ise yaramadı.
Neler geliştirilmeli?	**Neler bizi şaşırttı?**
Silah geliştirilebilir. Polisi öldürme olabilir. Level eklene bilir	Scratchten böyle bi oyun alıp Dr. Scratchten 15 puan almak çok zor. Bunlar beni şaşırttı.

Figure 11. Example User Feedback Template

Data Analysis

The DT rubric was scored by 2 instructors during the implementation of the activities and compliance between the raters was evaluated. The intra-class correlation coefficient (ICC) was calculated for the compliance between the raters and this value was obtained as .825. According to Koo and Li (2016, p.158), the ICC found between 0.75 and 0.90 is indicative of sufficient reliability. The boxes in the DT Observation Form are marked with the level of which gifted students are involved in the DT phases. For DT observation form, the compliance between the observers was examined by calculating "Weighted Kappa Coefficient" and this value was calculated as .68. Accordingly, there is a sufficient level of compliance among the observers and this value shows that results are purged from the chance factor (Şencan, 2005). Conducted interviews examined through content analysis.

3. FINDINGS AND DISCUSSION

Design thinking worksheets (Empathy Map, POV statements, User Feedbacks), note sheets used in the brainstorming process and prototypes developed during the DT process were

examined with DT Rubric. In Table 1, the scores obtained from the criteria of DT rubric are shared.

Table 1

Groups' Scores from Each Criteria of DT Rubric

Phases	DT 1					DT 2					DT 3					DT 4					DT 5				
	G1	**G2**	**G3**	**G4**	**G5**	**G1**	**G2**	**G3**	**G4**	**G5**	**G1**	**G2**	**G3**	**G4**	**G5**	**G1**	**G2**	**G3**	**G4**	**G5**	**G1**	**G2**	**G3**	**G4**	**G5**
E	3	3	4	4	4	3	4	4	3	3	4	3	2	4	4	4	4	3	4	4	4	4	4	3	4
D	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
B	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
P	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
T^1	4	3	4	4	3	3	3	4	3	3	3	3	4	4	4	4	3	3	4	4	4	4	4	3	4
T^2	19	18	20	20	19	18	19	20	19	18	19	18	18	20	20	20	19	18	20	20	20	20	20	18	20
$\bar{X}$	19.2					18.8					19					19.4					19.6				

* G: Group, E: Empathy, D: Defining, B: Brainstorming, P=Prototyping, T^1=Testing, T^2=Total Score, $\bar{X}$: Groups' Average Points for All Design Tasks

When Table 1 is examined, it shows the scores obtained from the criteria of DT rubric of the 5 different groups (group members change in each design task) related to DT tasks and the average of scores of 5 groups for each design task. The average scores of the groups from the 1st DT Task was 19.2, for the 2nd DT Task average was 18.8, for the 3rd DT Task it was 19, for the 4th DT Task it was 19.4 and finally for the 5th DT Task the average score was 19.6. It can be said that the groups scored higher than the DT Rubric.

Using the DT Observation Form, observations were conducted for eight lesson hours. The behaviors that enable students to demonstrate their skills in DT phases were examined by the observation form. When the behaviors related to empathy phase are examined; it was understood that students exhibited behaviors at Level 2 (n = 2), Level 3 (n = 14) and Level 4 (n = 9). Again, in the defining phase, students showed behaviors at Level 2 (n = 4), Level 3 (n = 16) and Level 4 (n = 5). In the process of brainstorming and prototyping, students presented the behaviors in Level 3 and Level 4. 12 students are in Level 3 and 13 students are in Level 4 in the phase of brainstorming. During the prototyping phase, 17 students are at Level 3 and 8

students are at Level 4. In the last phase of the test; 8 students showed behaviors belonging to Level 2, 11 students in Level 3 and 6 students in Level 4.

During the semi-structured interviews with four gifted students both prior and after the activities, they highlighted the tools of prototyping, DT process and features of designers. After execution of activities, as distinct from their prior thoughts, students mentioned that they learned the process, shared the results, enjoyed the experience, made their POV statements and repeated the phases during the process. As for prototyping tools; programming tools like Scratch, Appinventor etc., 3D design software and easy-to-find tools (cardboard, drinking straw, crepe paper, etc.) are mentioned. According to the students' views, a good designer should be able to empathize, work with teams, value the thinking process, and respect others' ideas. The fact that these characteristics of designers are mentioned only after the execution of the activities can be explained by effects of activities on the students' thoughts about the designer characteristics.

There is no study in literature that states and search upon DT activities implemented on gifted students specifically and the effects of activity achievements to students. Ayverdi (2018) used the Engineering Design Cycle in the STEM events, which is similar to the DT process. In the same study, as a result of the implementation of STEM activities, it was determined that the engineering skills of gifted students improved and the students enjoyed participating in the activities. In literature, there are studies that show DT activities implemented on ordinary students and achievements of students are examined. Duman and Kayalı (2017) executed DT ordinary students and it is found that activities applied to secondary school students were successful in terms of improving their DT skills. Aflatoony et al. (2018) state that DT skills of high school students have improved to a certain level as a result of the activities implemented. In other studies, as a result of the DT process, students learned academic content (Carroll et al., 2010; Carroll, 2015; Kwek, 2011; Painter, 2018) and had problems working with the team (Santos Ordóñez, González Lema and Miño Puga, 2017, Retna, 2016) and students enjoyed participating in DT process (Dukes and Koch, 2012). The results obtained in studies in literature and the results of this study support each other. During the implementation process of activities, students have chance to improve 21st century skills in the phases of empathy, defining, brainstorming, prototyping and testing (Henriksen et all., 2017). Many studies provide evidence that DT activities improve 21st century skills (Carroll, 2015; Diefenthaler, Moorhead, Speicher, Bear and Cerminaro, 2017; Koh et al., 2015; Scheer et al., 2011). The development of students'

DT skills after the implementation of the activities in this study is also a supportive indicator of this situation.

4. CONCLUSION AND SUGGESTIONS

After the execution of the DT activities, students stated in the interviews that they enjoyed DT activities, they learned the process, they had small arguments with team members during design process and it is hard to work with a team. After participating in DT process, students shaped the characteristics of a good designer according to their DT experiences, and concluded that a good designer should be able to work with a team and should be a respectful person. It is thought that obstacles experienced regarding the team work may result from almost all gifted students' tendency to be a leader and desire to manage team on their own. Additionally, the situations of some students being outsider to team work, not fulfilling their duties and not respecting to opinions of peers caused to having problems. Based on teacher observations, majority of students exhibit the behaviors of Level 3. Scores of students obtained from DT Rubric are also very high. At the end of execution of activities, it is observed that gifted students have improved their DT skills, learned the academic content and experienced some problems regarding working with the team.

For further studies, activities may develop to place DT thinking ways in detail. Students' roles like teamwork, participation in the DT process may be observed in detail more. The process used by the gifted students to reach the solutions for the design problems and their creativity levels can be investigated in detail. During the interviews with the students; collaboration can be portrayed like solidarity, good or bad in teamwork, contribution to the team and so on. The maximum number of students in a group should be 5 and the leadership skills of gifted students should be taken into account in group work. To increase the motivation of students in the process of brainstorming, the principles of gamification can be utilized such as giving badges to the group that produced the most amount of ideas. While DT is applied in programming teaching processes, block-based programming environments such as Scratch, Mblock and App Inventor, text-based programming environments such as Python, Arduino IDE, and for physical programming Lego Mindstorms and Arduino tools can be preferred.

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Özel Yetenekli Öğrencilere Programlama Öğretiminde Tasarım Odaklı Düşünme Uygulamaları

Özet
Çalışmanın amacı; tasarım odaklı düşünmenin (TOD) özel yetenekli öğrencilere programlama öğretimi süreçlerinde nasıl uygulanabileceğinin ve öğretim sürecine olan etkilerinin ortaya konulmasıdır. Araştırmada durum çalışması (örnek olay) yöntemi kullanılmıştır. Yapılandırılmamış bir probleme, programlama araçları ve TOD süreci kullanılarak çözüm üretmeye yönelik olarak 5 farklı TOD görevi tanımlanmıştır. TOD etkinlikleri, yaz döneminde, il merkezinde bulanan bir Bilim ve Sanat Merkezi'nde (BİLSEM) 25 özel yetenekli (13 kız, 12 erkek) öğrenciye uygulanmıştır. Veriler araştırmacılar tarafından geliştirilen TOD Rubriği, görüşme ve gözlem formu kullanarak toplanmıştır. Araştırmanın sonuçları özel yetenekli öğrencilerin TOD becerilerini belirli bir seviyeye kadar geliştirdikleri, akademik içeriği öğrendikleri, süreçten keyif aldıkları ve takımla çalışma konusunda birtakım sıkıntılar yaşadıklarını göstermiştir. Uygulama süreci sonunda öğrenciler, iyi bir tasarımcının takımla çalışabilen saygılı birisi olması gerektiğini vurgulamışlardır. Ayrıca, öğrenci görüşlerine göre Scracth, Arduino IDE, Lego Mindstorms EV3 gibi farklı programlama araçları ve ortamları TOD sürecinin prototipleme aşamasında kullanılabilir. TOD etkinliklerinin TOD düşünme şekillerine yer verecek şekilde güncellenmesi ve uygulama sürecinde özel yetenekli öğrencilerin liderlik özelliklerinin dikkate alınması önerilebilir.
Anahtar kelimeler: tasarım odaklı düşünme, farklılaştırma, özel yetenekli öğrenci, programlama, etkinlik tasarımı.

About the Authors

Yunus Emre Avcu

Yunus Emre Avcu is a computer science teacher at Şehit Prof. Dr. İlhan Varank Science and Art Center (BİLSEM). He has been working with gifted students for six years. He received his BA in Computer Education & Instructional Technology Department and MS in Curriculum and Instruction Department at Çanakkale On Sekiz Mart University. He gained a Ph.D. in Curriculum and Instruction Department at Balıkesir University in November 2019. His interest areas are gifted education, differentiation, creativity, design thinking, computational thinking, instructional design, programming, and using technology in gifted education.

Mailing Address: Şehit Prof. Dr. İlhan Varank Art and Science Center, Balıkesir, Turkey, 10020
E-mail: yunus1099@hotmail.com

Kemal Oğuz Er

Kemal Oğuz Er is Associative Professor of Curriculum and Instruction Department at Balıkesir University. Dr. Er received his BA and MS in Curriculum and Instruction Department at Hacettepe University and Ohio University respectively. He gained a Ph.D. in Curriculum and Instruction department at Ankara University in 2006. His interest areas are curriculum design, program evaluation, teacher education, comparative studies and philosophical, historical and social foundations of education.

Mailing Address: Balıkesir University, 10100, Balıkesir, Turkey
E-mail: keoguzer@gmail.com

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Annexes

Annex 1. Empathy Map Template

Group Name :
Lesson : Information Technologies and Software
Activity Name :
Instructions: After the interview, please fill out the "Empathy Map" with your group members.

What They Said / Done	My Thoughts / Feelings
Interviewer's observations that are seen and heard stated in this section. The sentences that come out of the interviewee's mouth are included in the quotes without being changed. ...	Based on the data in the what they said / done section, deductions are made about the user and assumptions are noted. ...

Annex 2. POV Template

Group Name :
Lesson : Information Technologies and Software
Activity Name :
Instructions: Make POV statements by completing the sentences in the table below.

……..……..……'s,(user's name) …… (verb) needs to find a way / method for that; Because……. (insight)

Annex 3. User Feedback Template

Group Name :
Lesson : Information Technologies and Software
Activity Name :
Instructions: Record user feedbacks by filling out below table.

What worked out?	What did not work out?
…	…
What should be improved?	**What has surprised us?**
…	….

Annex 4. Design Thinking Rubric

Group Name:

Design Thinking Task:

	Levels				
Criteria	**1 (Weak)**	**2 (Moderate)**	**3 (Competent)**	**4 (Most Competent)**	**Score**
Empathy	Interview questions are prepared proper to the design task and directed to user	The information gathered from interview noted randomly	The information gathered from the interview noted in empathy template by stating direct sentences coming from person's mouth	The information gathered from the interview was written down in the empathy template by including the sentences coming directly from the mouth of the person and the assumptions about the user stated.	
Point of View (POV)	One proper and clear POV statement has been written	Two clear POV statements have been written partly properly	Three clear POV statements have been written almost properly	At least four clear POV statements have been written totally properly	
Brainstorming	0-5 ideas produced	5-15 ideas produced	15-25 ideas produced	More than 25 ideas produced	
Prototyping	No unnecessary things were included in the prototype, the design was partially interesting and visually successful.	No unnecessary things were included in the prototype, the design was very interesting and visually successful.	Easily used prototype with no unnecessary things and the design was very interesting and visually successful	Easily used prototype with no unnecessary things included and the design was very interesting and visually successful also enabled the user interaction	
Testing	Prototype is used by user and it is noted what has been worked out	Prototype is used by user and it is noted both what has been worked out and not	Prototype is used by user and it is noted both what has been worked out and not, with the points need to be improved	Prototype is used by user and it is noted both what has been worked out and not, with the points need to be improved and what have surprised design team	
				Total	

Annex 5. Observation Form

Design Thinking	EMPATHY				DEFINING/ POINT OF VIEW				BRAINSTORMING				PROTOTYPING				TESTING			
Level	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Student Name	Starts the design process by getting information from others	Gathers some information from others and develops an appropriate approach by	Demonstrates understanding of others' perspectives and experiences	Shows that understanding of others and the systems or processes in which they operate and can think like others	Prioritize needs and insights based on perceived importance	Synthesizes information and prioritizes needs and insights according to perceived importance	Synthesizes information based on needs and insights from multiple open and unclear internal and external sources	Synthesizes deep insights based on the whole system	Generates ideas with others and records	Structures and produces extraordinary ideas based upon the ideas of others	Reach out to extraordinary ideas through simple ideas by brainstorming	Uses many techniques to reach all these various ideas	Creates a physical or visual representation of an idea	Creates a physical or visual representation of an idea that can be evaluated and developed	Defines the characteristics of the idea that should be evaluated and repeated according to the feedback	Creates complex models / pre-products that address various approaches to solve a problem.	Uses a model to decide to what degree the idea works.	Organizes an effective model test, requests feedback, arranges the feedback into operational results.	Requires feedback for specific properties and creates a representative measurement case and gets results after reporting future repeats.	Identifies the most suitable real-life situations for measurement and observes many sample universes and obtains complex results that are reporting future repetitions.
Student 1																				
Student 2																				
Student 3																				
...																				
...																				
Total																				

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Sentiment Analysis for Distance Education Course Materials: A Machine Learning Approach

Usame Omer OSMANOGLU[a]
Osman Nuri ATAK[b]
Kerim CAGLAR[c]
Hüseyin KAYHAN[d]
Talat Cemre CAN[e]

[a] usa.osm@gmail.com; Osmangazi University, Eskisehir, Turkey; ORCID: 0000-0002-1198-2447
[b] osmannuriatak@anadolu.edu.tr, Anadolu University, Eskisehir, Turkey; ORCID: 0000-0002-1198-2447
[c] kerimcaglar@anadolu.edu.tr, Anadolu University, Eskisehir, Turkey; ORCID: 0000-0001-7675-4552
[d] huseyinkayhan@anadolu.edu.tr, Anadolu University, Eskisehir, Turkey, Eskisehir, Turkey; ORCID: 0000-0001-9036-3312
[e] talatcemrecan@gmail.com, Eskisehir Osmangazi University, Eskisehir, Turkey; ORCID: 0000-0002-0220-3878

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Research Article

Abstract

Nowadays many companies and institutions are interested in learning what do people think and want. Many studies are conducted to answer these questions. That's why, emotions of people are significant in terms of instructional design. However, processing and analysis of many people's ideas and emotions is a challenging task. That is where the 'sentiment analysis' through machine learning techniques steps in. Recently a fast digitalization process is witnessed. Anadolu university, that serves 1 million distant students, is trying to find its place in this digital era. A learning management system (LMS) that distant students of the Open Education Faculty (Açıköğretim Fakültesi) is developed at the Anadolu University. Interaction with students is the clear advantage of LMS's when compared to the hard copy materials. Book, audio book (mp3), video and interactive tests are examples of these materials. 6059 feedbacks for those online materials was scaled using the triple Likert method and using machine learning techniques sentiment analysis was performed in this study. 0.775 correctness ratio was achieved via the Logistic regression algorithm. The research concludes that machine learning techniques can be used to better understand learners and how they feel.

Keywords: Sentiment Analysis, Machine Learning, Application Feedbacks, Deep Learning, Distance Education.

1. INTRODUCTION

Many students of the open universities are employed, already working individuals. Many of them hardly find time to study and, therefore, looking for learning materials that they can access anytime anywhere. Thus, digital learning materials become even more important for distance learners than ever. Besides, tailoring these materials is possible by benefiting from sentiment analysis even at systems where learning at scale occurs.

At Anadolu University, which is a Giga University with more than one million students (Bozkurt, 2019a), students in eCampus Learning Management system can reach all the

materials of their active semester courses (Büyük et al., 2018; Düzenli et al., 2019) and they are able to give 250 characters limited feedbacks for these materials. In this regard, analyzing feedbacks collected from students have become an important data source to better understand what has been happening in eCampus learning ecology.

Distance education can be defined as "any learning activities within formal, informal, and non-formal domains that are facilitated by information and communication technologies to lessen distance, both physically and psychologically, and to increase interactivity and communication among learners, learning sources and facilitators" (Bozkurt, 2019b, p. 267) and the field of distance education has changed dramatically after 2000s when a paradigm shift observed due to capacity increase derived from ICT and online networked technologies (Bozkurt, 2019c). While it was once considered a special form of education using nontraditional delivery systems, it is now becoming an important concept in mainstream education. Concepts such as networked learning, connected learning spaces, flexible learning and hybrid learning systems have enlarged the scope and transformed the nature of earlier distance education models (Gunawardena, & McIsaac, 2013). In this transformation process, information and communication technologies played a vital role (Bozkurt, Zawacki-Richter, & Aydin, 2019). Considering interaction and communication is an important element of distance education processes, analyzing, identifying and understanding learners' feelings through sentiment analysis is considered significant.

In this study, researchers will analyze feedbacks gathered from eCampus system by using machine learning techniques. After analyzing feedbacks about a material, we expect to have an idea about sentimental value of the material such as positive, negative or neutral. By doing so, materials that has mostly negative feedbacks can have a priority over the others to be improved before the next semester.

1.1.Machine Learning

Machine learning first appeared in 1950's as a sub-branch of artificial intelligence. Till 1990's, there was no important progress at machine learning. However, the studies on machine learning restarted in 1990's and machine learning has a continuous progress till today. There is no doubt that it will progress even more in the future. Machine learning is based on the idea of finding the best model for new data by using the previous gathered data. That is why machine learning studies will continue as more data gathered (Celik, & Altunaydın, 2018) and will be significant

to better understand changing perspectives of distance education landscape (Bozkurt, 2019d; Sharma, Kawachi, & Bozkurt, 2019a; 2019b).

Learning has been described as the process of improving behavior through the discovery of new information over time. Machine learning provides effective solutions for educational processes and the concept of improvement is the status of finding the best solution for future problems by gaining experience from the existing examples in the process of machine learning (Altunisik, 2015). With the development of information technologies over time, the concept of big data has emerged. The concept of big data is defined as very large and raw data sets that limitless and continue to accumulate, which cannot be solved by traditional databases methods (Bozkurt, 2017; Sirmacek, 2007). The operations performed on the computer using the algorithm are performed according to a certain order without any margin of error. However, unlike the commands created to obtain the output from the data entered in this way, there are also cases where the decision-making process takes place based on the sample data already available. In such cases, computers can make the wrong decisions such as mistakes that people can make in the decision-making process. In other words, machine learning is to gain a learning ability like human brain to computer by taking advantage of data and experience (Gor, 2014) The primary aim of machine learning is to develop models that can train to develop themselves and by detecting complex patterns and to create models to solve new problems based on historical data (Turkmenoglu, 2016). Machine learning and data-driven approaches are becoming very important in many areas. For example, smart spam classifiers protect our e-mails by learning from large amounts of spam data and user feedback. Ad systems learn to match the right ads with the right content; fraud detection systems protect banks from malicious attackers; Anomaly event detection systems help experimental physicists to find events that lead to new physics.

2. LITERATURE

Boynukalın (2012) developed at framework for Turkish text at a study conducted in 2012 for analyzing emotions. This study gives information about weka, zemberek, Wllr ordering and n-gram approaches. An international questionnaire dataset and Turkish tales' dataset are used in the study. First dataset was translated to Turkish, and typos were corrected using the zemberek library. For the second dataset, 25 tales were used and tales were divided to paragraphs and sentences because those contained emotions. Emotions were classified as happiness-anger-

fear-sadness. Different methods and weighting were used and success ratios between %42 and %85 obtained. Guran, Uysal, & Dogrusoz (2014) condcuted a study about the feedbacks on the internet for the products people bought. They used support vector machine (SVM) for classifying feedbacks and got successful results. They evaluated the results by analyzing the SVM parameters. Similarly, Turkmenoglu and Tantug (2014) studied sentiment analysis on Turkish texts in 2015. They used two different sentiment analysis methods and divided texts in to two datasets one containing long texts and the other containing long texts. In their study, Garcia and Yin (2015) mentioned positive-negative classification and 1 or 5 star classification. Clustering, model sweep and test error are mentioned in the methodology. In the classification, tree classifier, Naive Bayesian classifiers and model inference are used. As a result, they prepared a classifier for the prediction of positive-negative sentences. Akgul et al, (2016), in their study, formed four separate data sets by using a specific query word in Turkish in Twitter environment and classified the results as positive-negative and neutral. They have made Turkish character transformations by removing unnecessary characters and words. They used dictionary and n-gram model in their studies and observed an increase of 5% and 10% in three data sets in dictionary method and scoring. The N-gram study yielded a 4% to 7% increase in success in neutral tweets. As a result, they achieved approximately 70% and 69% success in dictionary and character-based n-gram methods, respectively. Kaynar et al. (2016) implemented a study based on the comments made for the movies on Twitter. According to the content of the comments, Naive Bayes conducted emotion and thought analysis using classification algorithms such as Center Based Classifier, Multilayer Artificial Neural Networks (MLP) and Support Vector Machines (SVM). They found that artificial neural networks and support vector machines gave better results in both training and test data. Baykara and Gurturk (2017) analyzed the comments of a specific twitter user in their work in 2017. They used Bayesian algorithm in their studies and classified them according to their contents. Not only positive, negative or neutral but also categorized message content (news, politics, culture) successfully. Parlar et al. (2017), in their study, conducted sentiment analysis from the shares made on Twitter. Using the Entropy Modeling classification algorithm on data sets, they compared the performances of 4 feature selection methods, Chi-square, information gain, query expansion ranking and ant colony optimization. Query Expansion Sort sensitivity analysis on the performance of Ant Colony Optimization on Turkeys' Twitter data from other traditional methods of feature selection methods have been observed to exhibit better performance. Gazioğlu and Seker (2017) conducted emotion analysis on English tweets in their study in 2017. Unlike other studies, they

used emojis instead of classifying them as positive, negative and neutral. They created 15 different emoji groups and divided the tweets into these emoji classes. Durahim et al. (2018) conducted music classification studies in 2017. Predefined categories such as music genres and moods were created, and 45 Turkish popular artists were selected and labeling was done for the classification in 2 of 3 people if consensus was reached. The data set was prepared with 75 songs in each of the four sensory categories. As a result of the training of a successful model, the most successful classification algorithm is found to be Multinomial Naive Bayes which has a success rate of 46%. In the study conducted by Yigit (2017), call center data for text mining was used to convert the calls received from call centers to voice-to-text. Also, positive-negative classification, negative / positive percentage, average negative / positive score, total negative / positive score have been calculated. In experiments, decision tree, KNN, SVM, etc. algorithms were used. According to the results of the experiment, the most successful classification was SVM algorithm with 82% accuracy. In their study, Celik et al (2017) aimed to estimate the gender of the commentators through machine learning techniques by analyzing the comments of the companies registering on Facebook. In the study, the gender of the commentators was labeled according to the names in the comments collected from Facebook. The data set is divided into 70-30% of training and test data. As a result of the study, it was seen that machine learning methods were estimated with similar accuracy rates and the highest accuracy rate (74.13%) was obtained by logistic regression method. Celik and Osmanoglu (2020) further aimed to realize the learning with the data sets obtained from the comments made on the social platforms of the identified brands and to give the researchers the best way to convey emotion analysis. Achieved accuracy rates are wide due to disadvantages such as lack of attention to spelling rules on social media or other digital platforms. In the study, an accuracy of 70% was obtained. This demonstrates that machine learning can be used in review classification and emotion analysis. As explained above, though there are a vide arrange of studies on text mining and sentiment analysis, there is fewer research in the context of distance education. In this regard, this study intends to contribute to related literature by focusing on distance education processes and textual data in LMSs.

3. METHODOLOGY

3.1. Classification Algorithms Used for Research Model

This study benefits from data mining and analysis approaches. All analyzes were performed using Jupyter Notebook-Python. DecisionTreeClassifier, MLPClassifier, XGBClassifier, Support Vector Classifier (SVC), Multinomial Logistic Regression, GaussianNB and KNeighborsClassifier algorithms were used on the data set. In order to be used in machine learning, Clean Text, Spell Checker and Stop Words pretreatment processes were applied on the feedbacks gathered in the data set.

3.2. Logistic Regression

Logistic regression predicts the likelihood of a result having only two values. Linear regression is not suitable for values that can be expressed in binary system such as yes/no, true/false. Logistic regression produces a logistic curve limited to values between 0 and 1. Logistic regression is similar to linear regression, but it is generated using the natural logarithm of the probabilities of the target variable instead of the curve probability. Linear regression formula can be explained as followings;

$$y = b_0 + b_1 X$$

$$\text{Logit(p)=log(p/(1-p))}$$

In logistic regression b_0 moves the slope to the right and left, b_1 defines the slope of the curve. Logistic regression equation can be written with probability ratio (logit (p)) as a result (Figure 1) (Sebastian, 2015).

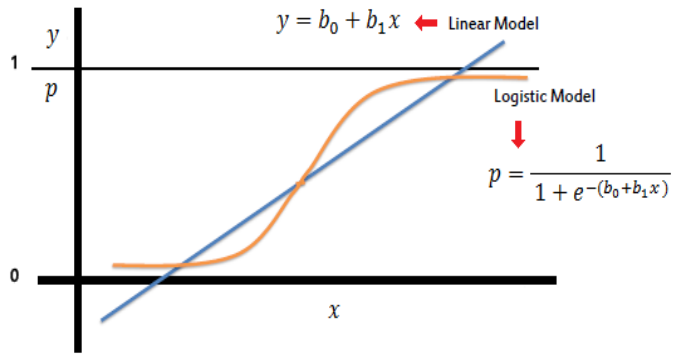


Figure 1. Logistic Regression Model Graph.

3.3. Criteria Used in Comparison of Classification Algorithms

The confusion matrix shows the correct class of data and the number of classes estimated (Table 1).

Table 1

Confusion Matrix

		Predict	
		Class 1	Class 0
Actual	Class 1	TP	FP
	Class 0	FN	TN

*TP: True Positive; FP: False Positive; FN: False Negative; TN: True Negative

The accuracy rate of the model; is the ratio of the number of correctly classified samples (TP + TN) to the total number of samples (TP + TN + FP + FN). The error rate is the one that completes the accuracy rate to 1. In other words, it is the ratio of the number of misclassified samples (FP + FN) to the total number of samples (TP + TN + FP + FN) (Celik & Osmanoglu, 2019).

$$Accuracy = \frac{\mathrm{TP} + \mathrm{TN}}{\mathrm{TP} + \mathrm{TN} + \mathrm{FP} + \mathrm{FN}}$$

3.4. Data Set

In this study, automatic 3-point Likert-type scaling was performed according to the words in the comments written by the users for the e-campus application. For example; if there are words such as ‘bad’, ‘less’, ‘low’, ‘inadequate’, ‘low’, ‘far’, ‘away’, ‘long’, ‘short’, ‘disliked’ in the content of the comment, they are labeled as 1. In the content of the comment, the words ‘should’, ‘if there were’,‘ more’, ‘would be’, ‘should show’, ‘should put’, ‘should write’ etc. are labeled as 2. If there are words like ’good’, ‘liked’, ‘super’, ‘useful’, ‘beautiful’, ‘successful’ in the comment content, they are labeled as 3. With this process, it was observed that the data set was unbalanced (Figure 2). After the labeling process, the data set distribution was as follows: 4438, 815, 806.

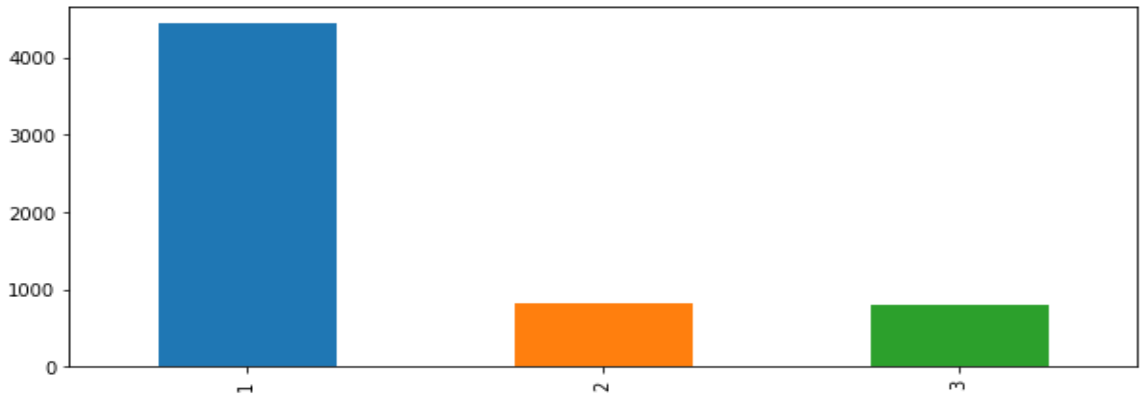


Figure 2. Tag class and number of comments in unbalanced data set.

The unbalanced data set was balanced by random sampling technique and the following distribution was reached: 800, 815, 806 (Figure 3).

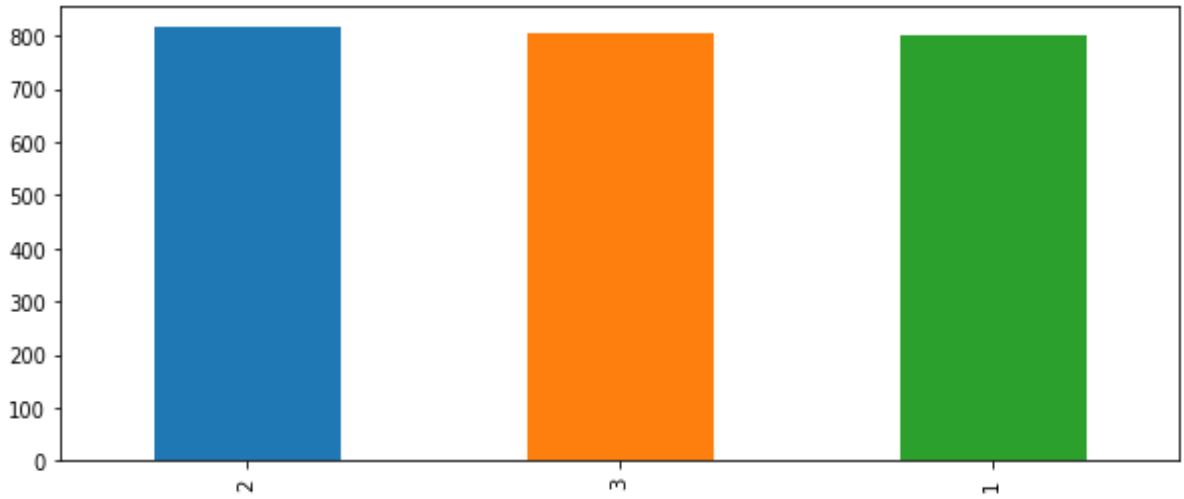


Figure 3. Label class and number of comments in balanced data set

3.5. Data Preprocessing

In this section, all comments are converted into lowercase letters and Turkish characters are converted into Latin alphabet letters (ç-ğ-ı-ö-ş-ü letters to c-g-i-o-u letters). Numbers, special characters, emojis, unnecessary words (with, one, -s, etc.) and non-Latin interpretations were omitted. The following techniques were applied to the balanced data:

1- Clean Text (CT); The application is used to achieve a general standard by performing the cleaning process on the comments. With this technique, all comments are converted to lowercase letters, and numeric expressions and punctuation are deleted.

2- Spell Checker (SC); to correct the misspelled words, it is applied on the comments
3- Stop Words (SW); The application is applied on comments to clear special characters, emojis, unnecessary (with, one, s, etc.), irrelevant and general words.

Eight different data sets obtained by applying these three techniques respectively were analyzed and the results are given in the table (Table 2). In addition, sample comments from the highest achievement data set are shown in Table 2.

Table 2

Results of the Analysis

		CT				SC				SW				CT + SC				CT + SW				SC + SW				CT + SC + SW				No Adj.			
		1	2	3	ACC	1	2	3	ACC	1	2	3	ACC	1	2	3	ACC	1	2	3	ACC	1	2	3	ACC	1	2	3	ACC	1	2	3	ACC
DT	1	184	72	19	0.67	187	71	17	0.68	185	62	28	0.67	207	49	19	0.75	96	166	13	0.35	196	49	30	0.71	228	50	18	0.77	168	79	13	0.65
	2	72	147	10	0.64	63	151	15	0.66	124	83	22	0.36	75	143	11	0.62	57	164	8	0.72	137	76	16	0.33	171	99	31	0.33	49	171	14	0.73
	3	17	8	213	0.89	17	19	202	0.85	81	19	138	0.58	9	11	218	0.92	32	84	122	0.51	80	17	141	0.59	104	26	164	0.56	16	11	206	0.88
	ACC				0.733				0.728				0.547				0.765				0.515				0.557				0.551				0.750
MLP	1	179	67	29	0.65	195	63	17	0.71	113	134	28	0.41	200	55	20	0.73	92	163	20	0.33	196	48	31	0.71	221	52	23	0.75	184	61	15	0.71
	2	50	159	20	0.69	56	150	23	0.66	49	157	23	0.69	58	151	20	0.66	51	163	15	0.71	130	83	16	0.36	159	109	33	0.36	58	151	25	0.65
	3	19	21	198	0.83	20	29	189	0.79	22	80	136	0.57	15	25	198	0.83	29	83	126	0.53	79	17	142	0.60	98	28	168	0.57	16	27	190	0.82
	ACC				0.722				0.720				0.547				0.740				0.513				0.567				0.559				0.722
XGB	1	188	57	30	0.68	176	73	26	0.64	88	171	16	0.32	159	88	28	0.58	53	207	15	0.19	95	160	20	0.35	96	194	6	0.32	131	112	17	0.50
	2	87	130	12	0.57	70	144	15	0.63	39	180	10	0.79	32	187	10	0.82	25	199	5	0.87	59	164	6	0.72	43	237	21	0.79	20	201	13	0.86
	3	3	8	227	0.95	13	6	219	0.92	11	102	125	0.53	2	14	222	0.93	17	117	104	0.44	20	99	119	0.50	17	144	133	0.45	3	19	211	0.91
	ACC				0.735				0.726				0.530				0.765				0.480				0.509				0.523				0.747
SVC	1	169	85	21	0.61	174	81	20	0.63	111	139	25	0.40	190	71	14	0.69	80	179	16	0.29	99	148	28	0.36	224	55	17	0.76	170	77	13	0.65
	2	51	165	13	0.72	38	176	15	0.77	46	165	18	0.72	51	166	12	0.72	38	184	7	0.80	57	166	6	0.72	168	103	30	0.34	39	183	12	0.78
	3	7	12	219	0.92	12	18	208	0.87	15	73	150	0.63	10	12	216	0.91	27	89	122	0.51	24	80	134	0.56	98	30	166	0.56	12	17	204	0.88
	ACC				0.745				0.752				0.574				0.771				0.520				0.538				0.553				0.766
LR	1	180	73	22	0.65	184	71	20	0.67	113	136	26	0.41	193	66	16	0.70	81	177	17	0.29	100	144	31	0.36	222	51	23	0.75	170	77	13	0.65
	2	41	171	17	0.75	44	169	16	0.74	44	165	20	0.72	52	167	10	0.73	34	176	19	0.77	58	161	10	0.70	160	102	39	0.34	38	181	15	0.77
	3	7	16	215	0.90	14	15	209	0.88	16	68	154	0.65	12	11	215	0.90	25	85	128	0.54	21	75	142	0.60	96	25	173	0.59	9	14	210	0.90
	ACC				0.763				0.757				0.582				0.775				0.519				0.543				0.558				0.772
GNB	1	139	111	25	0.51	146	106	23	0.53	105	45	125	0.38	197	54	24	0.72	50	198	27	0.18	86	36	153	0.31	258	29	9	0.87	162	70	28	0.62
	2	37	171	21	0.75	29	168	32	0.73	58	74	97	0.32	107	96	26	0.42	15	200	14	0.87	45	64	120	0.28	227	61	13	0.20	52	164	18	0.70
	3	24	28	186	0.78	11	30	197	0.83	15	16	207	0.87	22	19	197	0.83	12	96	130	0.55	11	10	217	0.91	147	38	109	0.37	26	31	176	0.76
	ACC				0.668				0.689				0.520				0.660				0.512				0.495				0.480				0.691
KNN	1	195	76	4	0.71	166	105	4	0.60	174	87	14	0.63	171	84	20	0.62	84	178	13	0.31	100	49	126	0.36	99	180	17	0.33	172	79	9	0.66
	2	108	114	7	0.50	72	150	7	0.66	113	99	17	0.43	78	138	13	0.60	46	170	13	0.74	63	79	87	0.34	59	220	22	0.73	92	129	13	0.55
	3	60	28	150	0.63	56	48	134	0.56	78	33	127	0.53	45	35	158	0.66	37	84	117	0.49	35	22	181	0.76	23	114	157	0.53	55	22	156	0.67
	ACC				0.619				0.606				0.539				0.629				0.500				0.485				0.534				0.629

Table 3

Sample Comments and Classes from the Data Set

Class	Sample Comments
3	I usually like the expression of my teacher Mutlu. The video is not fragmented, but it was nice to have it presented at once. Thanks for the video.
2	MP3 WILL BE GOOD.
1	why there is no lecture video about this course

4. FINDINGS AND DISCUSSION

The interpretations used in the data set were modeled with the algorithm of Decision Tree Classifier, MLP Classifier, XGB Classifier, Support Vector Classifier, Multinomial Logistic Regression, Gaussian NB and KNeighbors Classifier with Python programming language in Jupyter Notebook by using supervised learning approach of machine learning method.

First, 6059 tagged comments were used for training. However, since the results obtained from this model were poor due to the unbalanced data set, the data set was improved. For this purpose, a total of 2421 comments were analyzed from 800, 815 and 806 of the three classes, respectively. Around 70% of these data were used for training and 30% for testing. When the results of the study were examined, the best results were obtained with 0.775 accuracy of the model test of Logistic Regression algorithm (Table 4).

Table 4

Confusion Matrix for Logistic Regression Model After CT + SC Operations

		Prediction			
		1	2	3	ACC (%)
Actual	1	193	66	16	0.70
	2	52	167	10	0.73
	3	12	11	215	0.90
	ACC (%)				0.775

Table 4 shows that there is no significant difference between the success rate after the CT + SC corrections and the success rate of the data without any corrections. However, since the correction process takes time, it may be preferable to establish a model without performing correction process and to make the analysis according to this model and data.

Table 5

No Adj. Case for Confusion Matrix for Logistic Regression Model

		Prediction			
		1	2	3	ACC (%)
Actual	1	170	77	13	0.65
	2	38	181	15	0.77
	3	9	14	210	0.90
	ACC (%)				0.772

Such an approach can be used in a wide arrange of applications. For instance, there are some compulsory common courses in Turkish Higher Education System that are delivered through distance education (Durak et al., 2017) and analysis of discussions forums of these courses can provide interesting insights regarding their effectiveness and efficiency of the educational processes. Similarly, such analysis can helpful to improve social dimension of LMSs. For instance, social LMSs like Edmodo (Durak, 2017) or Massive Open Online Courses (Artsın, 2018) can provide better learning experiences if sentiment of the learners identified which would eventually increase the motivational aspects of learning (Şenocak, 2019; Uçar and Kumtepe, 2018).

In addition to above thoughts, sentiment analysis can be used in online networked learning spaces. Due to capacity in online networks, online networked societies and networked individuals are the reality of digital knowledge age (Castells, 2004; Chatti, Jarke, & Quix, 2010; Rennie, &Wellman, 2012) and learning occurs in these networked knowledge ecologies (Bozkurt, & Keefer, 2017; Bozkurt, & Hilbelink, 2019; Siemens, 2006). The literature suggests

that text-mining and sentiment analysis are very promising (Siemens, 2012; Shen, & Kuo, 2015) and much can be learnt about the learning environments and learners through sentiment analysis (Oliveiar, & Figueira, 2017).

5. CONCLUSION AND SUGGESTIONS

The data set resources used in this study was feedbacks of the distance learners. Accordingly, in distance education systems, where learning at scale occurs, such machine learning approaches can be used and that would enable to get insights how learners in these systems feel about.

For future research directions, researchers advise following suggestion. Accordingly, it would be more appropriate to compare the studies conducted in similar regions to alleviate the impact of regional differences on sentiment analysis. However, it should be noted that the success rate of the studies has ranged from 42% to 85%. One of the biggest constraints of sentiment analysis through interpretation is the non-observance of the grammar rules. Due to similar reasons, the accuracy rate range remains wide.

Uzaktan Eğitim Ders Materyalleri için Duygu Analizi: Bir Makine Öğrenme Yaklaşımı

Özet

Günümüzde birçok şirket ve kurum insanların ne düşündüğünü ve ne istediğini öğrenmek istemektedir. Bu soruları cevaplamak için birçok çalışma yapılmıştır. Bu yüzden, insanların duyguları öğretim tasarımı açısından önemlidir. Bununla birlikte, birçok insanın fikir ve duygularının işlenmesi ve analizi zor bir iştir. Makine öğrenme teknikleri ile 'duygu analizi' devreye giriyor. Son zamanlarda hızlı bir dijitalleşme süreci yaşanıyor. 1 milyondan fazla uzaktan eğitim öğrencisine hizmet veren Anadolu Üniversitesi, bu dijital çağdaki yerini bulmaya çalışıyor. Bu amaç doğrultusunda Anadolu Üniversitesi'nde Açıköğretim Fakültesi'nin (Açıköğretim Fakültesi) uzak öğrencilerini kapsayan bir öğrenme yönetim sistemi (LMS) geliştirilmiştir. Öğrencilerle etkileşim, basılı materyallerine kıyasla LMS'lerin açık avantajıdır. Kitap, sesli kitap (mp3), video ve interaktif testler bu materyallere örnektir. Bu çevrimiçi materyaller için 6059 geri bildirim üçlü Likert yöntemi kullanılarak ölçeklendirilmiş ve bu çalışmada makine öğrenme teknikleri duygu analizi kullanılarak yapılmıştır. Lojistik regresyon algoritması ile 0.775 doğruluk oranı elde edilmiştir. Araştırma, makine öğrenme tekniklerinin öğrencileri ve nasıl hissettiklerini daha iyi anlamak için kullanılabileceği sonucuna varıyor.

Anahtar Kelimeler: Duygu Analizi, Makine Öğrenmesi, Uygulama Geri Bildirimleri, Derin Öğrenme, Uzaktan Eğitim.

About the Author(s)

Usame Omer OSMANOGLU

Usame Omer Osmanoglu has got bachelor's degree from Eskisehir Osmangazi University, Department of Statistics in 2012. He has got master's degree from Eskisehir Osmangazi University, Department of Biostatistics in 2016. And, he has been continuing his academic life as a doctoral student in the same department in Eskisehir Osmangazi University, while he is working as Data Scientist in a software company. His interest areas are biostatistics, machine learning, artificial intelligence and traditional archery.

Mailing Address: Eskisehir Osmangazi University, Department of Biostatistics, Eskisehir, TURKEY, 26040,
E-mail: usa.osm@gmail.com

Osman Nuri ATAK

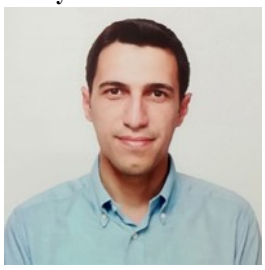
Osman Nuri Atak graduated from Yıldız Technical University, Department of Computer Engineering in 2005 and got master's degree from Osmangazi University, Department of Computer Engineering in 2019. He continues his academic career as a doctoral student in the Department of Mathematics and Computer Science of Osmangazi University. In the meantime, ATAK conducts his work activities and is interested in suggestion systems, machine learning, learning management systems, learning analytics, software architecture.

Mailing Address: Anadolu University, Learning Technology Research and Development Department, Eskisehir, TURKEY, 26210,
E-mail: osmannuriatak@anadolu.edu.tr

Kerim CAGLAR

Kerim Caglar has got bachelor's degree from Eskisehir Osmangazi University, Deparment of Mathematics and double major with Electrical electronics enginnering. He has got master's degree from Eskisehir Osmangazi University, Department of Mathematics-Computer in 2018. And, he has been continuing his academic life as a doctoral student in the same department in Eskisehir Osmangazi University, while he is working as software developer in Anadolu university. His interest areas are machine learning, artificial intelligence, internet of things, robotics and mobile programming.
Mailing Address: Anadolu University, Learning Technology Research and Development Department, Eskisehir, TURKEY, 26210,
E-mail: kerimcaglar@anadolu.edu.tr

Huseyin KAYHAN



Huseyin Kayhan received his bachelor's degree in Electrical and Electronics Engineering from Eskişehir Osmangazi University. He is a graduate student in Computer Engineering at Bilecik Şeyh Edebali University. He works as a software developer. His research interests include embedded systems, machine learning and artificial intelligence.

Mailing Address: Anadolu University, Learning Technology Research and Development Department, Eskisehir, TURKEY, 26210,
E-mail: huseyinkayhan@anadolu.edu.tr

Talat Cemre CAN

Talat Cemre CAN has got bachelor's degree from Eskisehir Osmangazi University, Department of Mathematics and Computer Science in 2018. He is currently studying for a master's degree at Eskisehir Osmangazi University, Department of Computer Science. In the same time, he is working as a data scientist at the software company. He is involved in python open source community and passionate about generative adverisial networks.

Mailing Address: Eskisehir Osmangazi University, Department of Biostatistics, Eskisehir, TURKEY, 26040,
E-mail: talatcemrecan@gmail.com

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Discourse on student participation in the Open Distance Learning using Open Educational Resources

Ramashego Shila Shorty MPHAHLELE[a]
Matlala Violet MAKOKOTLELA[b]

[a] Emphahrs@unisa.ac.za; University of South Africa, Pretoria, South Africa; ORCID: 0000-0002-9917-7089
[b] Emakokm@unisa.ac.za, University of South Africa, Pretoria, South Africa; ORCID: 0000-0003-0297-7408

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Review Article

Abstract

The concepts Open Distance (ODL) and the Open Educational Resources (OER) are central to Higher Education around the globe. Although the OER are understood to be freely available online material that anyone can use for teaching and learning purposes, there is some evidence to suggest that majority of students in the African continent do not use the OERs. On the other hand, existing research recognises the ODL as the learning environment that breaks the barriers that limit students to access higher education such as location and distance from the university, financial pressures and other social problems. This paper reflects on the students' participation and use of OERs, focusing in purposively three selected ODL institutions. Drawing from community of inquiry framework, and given the nature of the ODL environment, this paper argues that students' lack or limited participation in the use of OER seem to be dominated by what the OER can do which is promotion of access, equity and quality. This argument is presented with the full acknowledgement that access to Information and Communication Technologies (ICT) is essential to access, adapt and use the OERs.

Keywords: Cognitive presence, Community of Enquiry Framework, Open and Distance Learning, Open Educational Resources, Social presence and Teaching presence.

1. INTRODUCTION

One of the dominant assumptions made about Open Distance Learning (ODL) is that it has a potential to generate additional educational and economic values. This assumption is motivated by Fischer, Heise, Heinz, Moebius, and Koehler (2015) by further highlighting that the changed student needs, increased competition between organizations, different political and economic conditions, as well as new educational and technological approaches in higher education require technology to make higher education more accessible to students. This paper focuses mainly on students' participation upon gaining access through admission into the ODL institutions.

Through a Community of Inquiry (CoI) Framework as methodological lens, the author(s) reflect on the students' participation and access of the Open Educational Resources (OER) focusing in purposively selected ODL institutions.

The journey towards the birth of OER according to Organisation for Economic Co-operation and Development (OECD, 2007) started around the year 2002 through the initiative by the Massachusetts Institute of Technology (MIT). In their report, (OECD, 2007) describes some of the early stages that led to the introduction of OERs citing sources such as (Johnstone, 2005; Moore, 2002) and emphasising that Materu (2004)'s report was viewed as the first comprehensive report that shaped the understanding of the OER. It should however be noted that the term OER as confirmed by Johnstone (2005) first came into use at a conference hosted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2002. It was then defined as the open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes. Between the year 2002 and 2015 most often used definition of OER that was corroborated by OECD (2007) is "digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research. In addition, Butcher AND Moore (2015) after considering relatively few historical studies in the area of OER namely: the William and Flora Hewlett Foundation; OECD; UNESCO; Cape Town Open Education Declaration and OER commons advised that the definition of OER should include licence that is as open as possible, encourages right of access for everyone. With similar view are McGrea, Miao, and Mishra (2016) who define OER as teaching, learning and research materials in any medium, digital or otherwise, that permit no-cost access, use, reuse and repurposing by others with no or limited restrictions. In the light of the afore-mentioned definitions, this paper draws from Community of Inquiry framework in reflecting to some of the evidence that suggest that majority of students in the ODL institutions from the African continent and beyond still experience some major restrictions in accessing teaching and learning material.

2. LITERATURE

The literature for this paper was reviewed in relation to the students' participation in the ODL and the challenges experienced when using OERs in the ODL institutions.

2.1. Students' participation in ODL

Researchers (Maritim & Getuno, 2018) view the ODL institutions as the learning environment that were established with the aim to democratise higher education in order to break the barriers that limit students to access higher education such as location and distance from the university, financial pressures and other social problems. In addition, Pitsoe and Letseka (2018) theorise ODL as a tool with potential to empower the previously marginalized majority African populations. That being the case, Maritim and Getuno (2018, 1-15); Pitsoe and Letseka (2018, 113-125) did not only identify the roles of ODL, they also noted a need to increase the students' participation in the ODL. By drawing on the need to increase participation in the ODL, Prinsloo (2015) distinguishes participation from access however, acknowledging possible theoretical and analytical approaches to exploring participation in ODL as well as the linkage and overlaps in literature between the notions of access and participation. When defining participation in the context of South Africa, Prinsloo (2015) referred to the argument made by Chowdry, Crawford, Dearden, Goodman, and Vignoles (2013) that participation means increasing the number of students from previously disadvantaged background (lower socio economic) and minority or under-represented in the higher institutions of learning.

This paper focuses on participation of students in the teaching and learning activities when they have already enrolled in the ODL institutions. It should be noted that for students to learn effectively in the ODL institution, there should be a Ubiquitous Learning Environment (ULE) created by the course managers and designers. (Mphahlele, 2019) established that ULE can be described as a balancing technique that breaks the barriers of both time and location (physical distance) within the learning environment. For Mphahlele, the ULE as the learning environment in the ODL places varying demands on delivery and feedback methods (due to time and location) and relies on different levels of knowledge and skills thus affecting student participation. Against this background, it is worth exploring the role of OER on students' participation in the ODL based on the description of OER by McGrea et al., (2016). It should however be noted that despite the elucidated description of OER as the potential solution to students' participation in the ODL's ULE in the more cost-effective manner, Common Wealth of Learning (2015) warns about the challenges experienced in many developing countries and are discussed in the section below.

2.2. Challenges experienced by students when using OERs in the ODL institutions

The authors established that most OER are digital instructional material and came to the conclusion that students may require the following in order to be able to use the OER to participate in the ODL: (1) digital literacy, (2) digital citizenship and (3) digital equity. Below the authors explain in detail the need for each of the afore-mentioned aspects for students when using the OER in the ODL.

2.2.1. Digital literacy

The necessity for digital literacy was identified due to the rapid growth of digital formats of information in the higher education institutions (Odede & Jiyane, 2019). The definition of digital literacy by (Law, Woo, de la Torre, & Wong, 2018; Odede & Jiyane, 2019) , affirms its requirement for the students to be able to use the OER. Law et al., (2018) defines digital literacy as ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies. While Odede and Jiyane, (2019) share a similar view with Law et al., (2018), they further included digital literacy benefit for students to the definition which is an understanding of wide range of applications (e.g., word processing, presentations, web-based resources). Based on the afore-mentioned this paper argues that lack or limited digital literacy of students might negatively impact their on their use of OER which further affects participation in the ODL because the authors view digital literacy as being able to generate a deeper understating of the digital environment, evaluation of digital actions and co-creation of content with others.

A study conducted by D. Yazon, Ang-Manaig, Buama, and Tesoro (2019) to determine the relationship between digital literacy, digital competence and research productivity of educators found out that digital literacy are the set of competencies required for full participation in a knowledge society. Although the study is not linked directly with students' participation, the authors found the study relevant to highlight challenges which students with limited or lack of digital literacy might encounter. D. Yazon et al., (2019) revealed challenges such as choosing the right tools to find, use or create information. The other challenges include limited understanding on presenting themselves online, finding a person online, and using online tools and websites to find and record information online.

2.2.2. Digital citizenship

The challenges associated with digital citizenship which are experienced by students when using OER in the ODL emanate mostly from the four of the nine elements of digital citizenship as described by Ribble (2015) namely access, etiquette, communication and safety and security. Before outlining the challenges in relation to the above-mentioned elements of digital citizenship, it is better to first define the digital citizenship. The definition put forward by Ribble, Bailey, and Ross (2004) clearly imply its necessity because they view digital citizenship as the norms of behaviour with regard to technology use. They further concluded the definition by assuming that one can only understand digital citizenship and the issues of technology use, abuse, and misuse through the nine general areas of behaviour that make up digital citizenship. The authors did not see a need to list or explain the nine general areas of behaviour that make up digital citizenship because for the purpose of this paper the focus is on challenges (emanating from lack or limited digital citizenship) experienced by students when using OER in the ODL. The challenges are summarised in Table 1 below

Table 1

Challenges experienced

Element of digital citizenship	**Ideal for students to use the OER**	**Challenge experienced by students when using OER in ODL**
Digital access	• Equitable access for all students • Accommodations for students with special educational needs	• Financial ability to have technology in the home because of socioeconomic status, disabilities, and physical location (among other factors). However, these opportunities are not equally available to all students.
Digital communication	Students' access and ability for to use the following: • Email • Cell phones	Some students use text messaging and email shorthand for formal assessments

	• Personal video calls (Skype) • Instant messaging • Text messaging • Blogs • Wikis • Social networking	
Digital etiquette	• Using technology in ways that minimize the negative effects on others • Using technology when it is contextually appropriate	Some of the students engage in cyber bullying and the use of flaming, inflammatory language
Digital safety and security	• Protecting hardware, software and network security • Protecting personal security: identity theft, phishing and online stalking • Protection against hackers and viruses	• Financial ability to have firewalls, anti-viruses and data backup devices.

*Adapted from (Law et al., 2018; Ribble, 2015)

It should be seen from Table 1 that some of the elements such as access and safety and security pose challenges that most students might not circumvent. This paper pronounces that overcoming the challenges emanating from elements of digital citizenship has a potential to ensure mastery of responsible and appropriate technology use, including online communication etiquette and digital rights.

2.2.3. Digital equity

Digital equity according to Wong (2019) should be described beyond devices and on-premises infrastructure. The definition of digital equity should also emphasis the training of teachers on best practices for incorporating technology into instruction and offering students a consistent digital learning experience. Wong's argument can be grounded in some of the definitions of digital equity such as the one by Davis, Fuller, Jackson, Pittman, and Sweet (2007) which is more centred on devices. Davis et al., (2007) defined digital equity as equal access and opportunity to digital tools, resources, and services to increase digital knowledge, awareness,

and skill. With the similar view as Davis et al., (2007) is Benton Institute for Broadband and Society (2016) by maintaining that digital equity ensures all individuals and communities have the information technology capacity needed for full participation in the society, democracy, and economy. Authors of this paper remark from their experience as the lecturers in the ODL institution that that there exist significant disparities in access to high-quality technologies and serious inequities in how different groups of students acquire technology.

Against this backdrop, this paper contends that inequality in the access to educational technology or an absence of informed guidance regarding its use can actually magnify the inequities in students' educational experiences and further limit their opportunities for employment and participation. The authors back this contention by the findings of the study conducted by (Falck, Mang, & Woessmann, 2015; Tomer & Kane, 2015) which revealed that there are barriers experienced by students emanating from digital equity such as outdated incompatible or unreliable computers (where they found 32 percent) and internet access not being readily available in most areas where students reside. With that in mind, this chapter theorises that lack or limited digital equity, might close up opportunities to create and share a wider array of educational resources, which might also have a negative impact on the students' access and utilisation of the OER to enhance access to educational opportunities.

2.3. Problematising the use of OER in the ODL institutions

Despite the fact that Common Wealth of Learning (2015) embrace OER as flexible tools that allows for the use, reuse and adaptation of materials for local contexts and learning environments, while allowing authors to have their work acknowledged. This paper argues that there is a troublesome imbalance between the provision of OER and its utilisation. OECD (2007) uncovered that the vast majority of OER are in English and based on Western culture, and this limits their relevance and risks consigning less developed countries to play the role of users. It should however be noted that, a number of projects now exist in developing countries to develop OER based on their own languages and cultures of ODL. This attempt especially in the African countries is referred to as Africanising, decolonising and transforming the education systems, which the authors view as the best way to expand student participation in the higher education. It should also be noted that for the students to utilise OER, their lecturers should first select the relevant OER and to a certain extent repurpose to the context of the course content.

3. METHODOLOGY

This paper is conceptual in nature and it uses CoI Framework as methodological lens to reflect on students' participation and access of OER, focusing in particular on ODL institutions of three countries:

- India: Indira Gandhi National Open University (IGNOU)
- Mauritius: The University of Mauritius (UoM)
- South Africa: University of South Africa (UNISA)

The authors acknowledge that these universities have a broad spectrum of the differentiating qualities therefore, the author(s) employed diverse case method as one of the cross-case selection techniques. The diverse case method according to Seawright and Gerring (2008) is a selection of two or more cases intended to represent the full range of values characterizing X, Y, or some particular X/Y relationship. This selection method can be used for either exploratory or confirmatory. In this study, it was employed for exploratory function focusing on student participation in the ODL using OER. The caution that 'diverse cases are likely to be representative in the minimal sense of representing the full variation of the population" (Seawright & Gerring, 2008). With that in mind, it is worth indicating that the findings of this study may not mirror the distribution of that variation in the population.

The author(s) selected three cases (IGNOU, UoM and UNISA) with full consideration that, there is no guarantee to be representative of each category. The selection was mainly based on the following:

- They have studies conducted within the past five years about their use of OER;
- They are ODL institutions of the countries in the Commonwealth that have developed OER policies at the national level;
- Their countries are non OECD members;
- They participated in the OECD questionnaire aimed at mapping the open educational resources movement.

Firstly, the authors discuss the findings of three case studies without pretension to be exhaustive. Secondly, since the findings from the three case studies were obtained conceptually, there would be no data analysis instead authors reflected on the findings using the theoretical

framework underpinning this study (Communities of Enquiry Framework). Lastly conclusions were made from the reflections as well as suggestions for further research, and the limitations of the current study.

The research questions guiding this study are:

- How can the OER increase student participation in the ODL institutions?
- What are the experiences of students in accessing the OERs in ODL institutions?

Indira Gandhi National Open University' case study

The Indira Gandhi National Open University (IGNOU) case study as presented by Santosh and Santosh (2016) regards IGNOU as one of the largest ODL institution compared to the following five ODL universities in India:

- Dr. B.R. Ambedkar Open University, also known as Telangana (BRAOU), Hyderabad;
- Vardhaman Mahaveer Open University (VMOU), Kota;
- Yashwantrao Chavan Maharashtra Open University (YCMOU) Nashik;
- Netaji Subhas Open University (NSOU), Kolkotta;
- Tamil Nadu Open University (TNOU), Chennai.

The IGNOU has a capacity of 3 million cumulative student enrolment in above 40 countries, has emerged as a national resource centre for ODL, with international recognition and presence. To reach out to the unreached, the IGNOU has taken certain major initiatives towards the development of interactive multimedia content through web-based platforms. Some of the initiatives taken up at IGNOU are eGyanKosh, FlexiLearn, and Education Broadcast. FlexiLearn and Post Graduate Diploma in e-Learning (PGDEL) are presently not active because of nonexistence of a clear university policy for providing online courses and programmes of study, and for sharing and offering educational materials as OER.

Santosh and Santosh (2016) elucidate the success of IGNOU in using the OERs to the support from national policymaking bodies such as National Knowledge Commission (NKC), University Grants Commission (UGC). In the IGNOU, the lecturers are creating and using digital content for teaching and learning with the aim to embed the OER into the educational environments. The most striking aspect in this case study is the fact that IGNOU's other online programmes are not active due to non-existence of a clear university policy for providing online courses and programmes of study, and also for sharing and offering educational materials as

OER. Despite these challenges, Santosh and Santosh (2016) concluded that the OER phenomenon has potential growth in India looking at some of the success of IGNOU.

The University of Mauritius case study

The University of Mauritius is a national university of Mauritius. It is the oldest and largest university in the country in terms of student enrolment and curriculum offered. The public university's main campus is located at Réduit, Moka. This case study was taken from the study conducted by (Wolfenden, Auckloo, Buckler, & Cullen, 2017). They put forward the background of the University of Mauritius's involvement in the OER initiatives highlighting the hosting of a mirror site of the Massachusetts Institute of Technology (MIT) OpenCourseWare (OCW). This mirror site contributed to the European Union's Staff Improvement in Distance Education for Caribbean, African and Pacific universities (SIDECAP). There are five institutions involved in SIDECAP project, namely the Open University of the UK (project leader), the University of the Highlands and Islands Millennium Institute (UHI) in Scotland, the University of Mauritius (UoM), the University of the West Indies of Trinidad & Tobago (UWI) and the University of the South Pacific (USP). In this project, the University of Mauritius focuses on the repurposing of OER for distance learning programmes to fit in the Mauritius context (Santally, Cooshna-Naik, Conruyt, & Wing, 2015).

The findings from Wolfenden et al., (2017) study revealed that the University of Mauritius has made large numbers of resources freely available in digital form. However, there is as yet no formal policy on open content, and engagement with OER has typically been at the level of individual staff action. On the positive note, the use of OER helped reduce the courseware development costs and funds generated through the other paid courses made it possible to run the undergraduate diploma thereby allowing additional students to secure a place at the University on the Web and Multimedia Development Diploma.

University of South Africa's case study

In the South African context the author(s) looked at the study conducted by Cox and Trotter (2017). Their study was conducted in three different institutions of higher education but the author(s) selected the University of South Africa (UNISA) for the purpose of this paper. The reason for this selection is that UNISA has developed an institutional strategy and identified an action plan to deploy OERs. This includes infrastructure support, OER development and the use of open licenses. According to Cox and Trotter (2017) UNISA is all-inclusive, massive

ODL institution with over 400 000 students. They further posit that it is comparatively well resourced, historically multiracial and modestly privileged. The findings from Cox and Trotter's study among others indicated that many students did not have reliable access because they live in poor, rural areas with weak infrastructural support, or in urban townships far from the UNISA satellite centres. The most interesting finding in this case study is that despite the fact that developed OER strategy in 2014, their lecturers have the least control over the access of the OER and they also have relatively little control over their legal rights over the use or creation of OER.

4. REFLECTIONS ON THE FINDINGS THROUGH THE LENS OF COMMUNITY OF INQUIRY FRAMEWORK

As indicated in the methodology section of this paper, this section presents the authors' reflections through the lens of CoI Framework with the focus on student participation in the ODL using the OERs. Reflecting on the three case studies above, it is safe to conclude that for the students in the ODL institutions to access and use the OERs, the lecturers need to recommend or design the OER suitable for their courses. Drawing from the CoI framework, the author(s) of this study argue that the use of OER in the ODL institutions should go beyond accessing information. The institutions should focus on the elements of an educational experience that facilitate the creation of communities of students who are actively and collaboratively engaged in exploring, creating meaning, and confirming understanding (Garrison, 2017). To Garrison (2017), CoI represents the construction of knowledge through discourse and shared understanding that requires a commitment to and participation in a community of students that will support critical reflection and collaborative engagement. With this in mind, author(s) of this study maintain that student participation in the ODL can be enhanced when the use of OERs include the essential elements of CoI (cognitive presence, social presence, and teaching presence).

Figure 1 gives brief descriptions of the afore-mentioned elements of CoI.

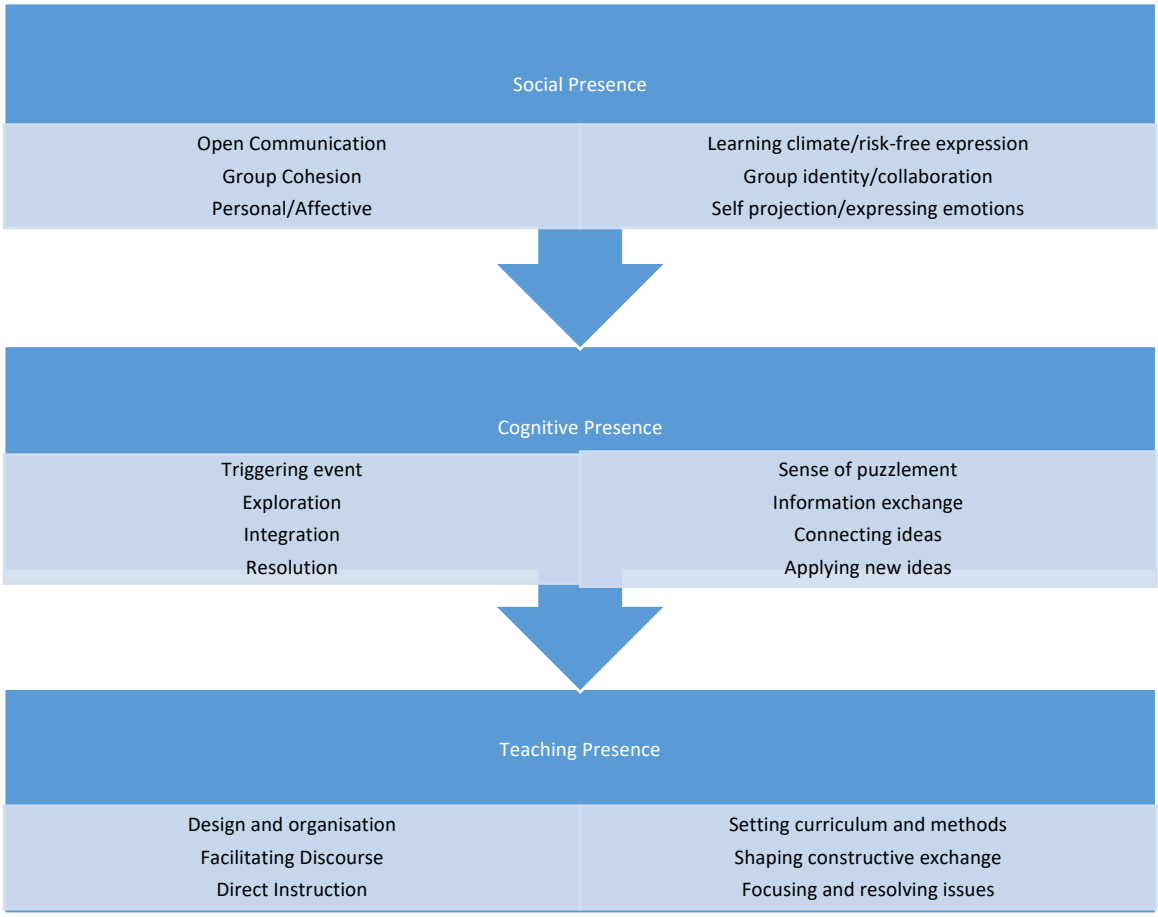

Figure1. Elements of Communities of Enquiry

Adapted from (Garrison, 2017)

It is apparent from Figure 1 that social presence can be possible when students use OERs to identify with the community (e.g., course of study), communicate purposefully with other students and lecturers, and develop inter-personal relationships by way of envisaging their individual personalities. With cognitive presence as opined by Garrison and Anderson (2003) and drawing from Figure 1 it is asserted that students can use OERs in the ODL institutions to explore and exchange information to construct meaning and confirm understanding. The data in Figure 1 demonstrates that teaching presence is hypothesized as having three responsibilities namely design, facilitation and direct instruction. Garrison (2017) proposes that these three responsibilities should be carried out in consideration of social and cognitive presence concerns.

When linking the findings in the case studies with the elements of CoI framework that are illustrated by Figure 1, there is a form of interdependence, which can also be related to the two research questions guiding this study.

4.1. Social presence

It is evident from the three case studies that only IGNOU and University of Mauritius are able to provide opportunities for students' social presence. The social presence is attributed to the fact that IGNOU has a capacity of 3 million cumulative student enrolment in above 40 countries using interactive multimedia content through web-based platforms. Similarly, the University of Mauritius has 5 institutions involved in its SIDECAP project and made large numbers of resources freely available in digital form. Although, Akcaoglu and Lee (2016) considers social presence (one of the elements of CoI) as an imperative component of online learning but difficult to achieve. UNISA has an enrolment of over 400 000 students across the globe however, those students did not have reliable access to technology because they live in poor, rural areas with weak infrastructural support, or in urban townships far from the UNISA satellite centres. Reflecting back on the challenges identified in the literature review section, authors view the challenges presented on Table 1 as having a potential to contribute towards making social presence difficult in the ODL institutions. Drawing from (Akcaoglu & Lee, 2016)'s definitions of social presence, the authors conclude that in the ODL setting the use of OER should enable communication among students that allow appreciation of interpersonal relationships, despite the fact that they are located in different places.

4.2. Cognitive presence

From the case studies it is apparent that IGNOU and University of Mauritius lectures are creating digital content fort the students.

> ….. the success of IGNOU in using the OERs to the support from national policymaking bodies….(Santosh & Santosh, 2016)

This paper theorises that the use of digital content for teaching and learning fosters cognitive presence in students in the sense that it allows information exchange among the students. Since IGNOU create the digital content with the aim to embed the OER into the educational environments that might address some of the challenges that emanate from digital equity. This statement is informed by the definition of digital equity by Wong (2019) who posit that digital equity exist where there is incorporation of technology into instruction and offering students a consistent digital learning experience. In the University of Mauritius the possibility of cognitive presence might result from the finding that the lecturers are repurposing the OER for distance learning programmes to fit in the Mauritius context. Even though UNISA's findings do not

ascertain any activities directed at achieving cognitive presence, it is evident that challenges related to digital equity affect the students.

> ….. students did not have reliable access because they live in poor, rural areas with weak infrastructural support…..(Cox & Trotter, 2017).

4.3. Teaching presence

In IGNOU, non-existence of a clear university policy for sharing and offering educational materials as OER, suggest that designing and organisation of the teaching and learning materials developed in this institutions might not facilitate the development of teaching presence. When describing teaching presence in the ODL institution, (Anderson, Rourke, Garrison, & Archer, 2001) summarized that:

> "Teaching presence begins before the course commences as the teacher, acting as instructional designer, plans and prepares the course of studies, and it continues during the course, as the instructor facilitates the discourse and provides direct instruction when required".

The University of Mauritius requires explicit policies on the way that the University is involved in the OER movement from creation to reuse, dissemination and sharing of the material. This finding highlights that lecturers using OER need to have a well-established set of guidelines that would provide a framework for the students' search and use of freely available content from the Web. Conceivably, it is noteworthy indicating that a lack of formal policy on open content, and engagement with OER, might negatively affect the institutions' teaching presence. In the sense that learning climate might not be risk-free and therefore, there would be limited exploration and application of new ideas.

It should be noted that from the three case studies, there are similarities with IGNOU and University of Mauritius context in terms of clear policies, which indicate the potential to affect all the elements of CoI unconstructively. In this study, it is perceived that it might be difficult for lecturers to facilitate discourse and difficult for students to have open communication or group cohesion/collaborations for information exchange.

5. CONCLUSION AND SUGGESTIONS

What the authors attempted to do in this paper is to delineate the students' participation and the use of OER in relation to the CoI framework. The authors reflected on three case studies

involving ODL institutions from India, Mauritius and South Africa. In authors' view, through the use of OER with the focus on the CoI framework in the ODL institutions, student participation can be increased. This view answers the first research question of this paper which was formulated as follows: How can the OER increase student participation in the ODL institutions? To answer the second research question, (What are the experiences of students in accessing the OERs in ODL institutions?), it is clear that lack or limited digital equity among the students in the selected ODL institutions negatively affect the students' development of digital literacy and digital citizenship. Drawing from the reflections on case studies through the lens of CoI framework and the challenges discussed in the literature section, the authors are suggesting the following to enhance the student participation in the ODL institutions:

- Lecturers should create or repurpose the OER to the context of the ODL institution to provide students with opportunity of social interaction, collaboration, discourse and scaffolding through learning platforms. In this way there will be social, cognitive and teaching presence.
- Lecturers should profile the OLD students to be able to curb some of the challenges or barriers emanating from the digital equity. For example when designing digital content they should make sure that it will be compatible to majority if not all the students' technological tools.
- When creating or repurposing the OER, the lecturers should make sure that the students' digital literacy and citizenship are enhanced by making sure that the OER stimulate the ability for students to use all the languages that converge in the new multimedia universe and other digital platforms.

6. LIMITATIONS AND FURTHER RESEARCH

While the authors were able to reflect on the findings of the case studies through the lens of CoI framework, some questions remain for future research. For example the impact of the use of OER on student participation and the strategies that can be used to address the challenges emanating from digital literacy, digital citizenship and digital equity. Exploring the students' performance was beyond the scope of this study due to its nature of being conceptual. Further research, therefore, should focus on collecting empirical data from the students regarding their performance as a result of using OER.

Açık ve Uzaktan Öğrenmede Açık Kaynak Kodlu Kaynakların Kullanımının Öğrenci Katılımı Açısından Değerlendirilmesi

Özet

Açık ve uzaktan öğrenme ve açık eğitim kaynakları kavramları yüksek öğretim için tüm dünyada önemli bir konuma gelmiştir. Açık eğitim kaynakları, öğrenme veya öğretim amaçlı olarak kullanılabilen ve ücretsiz olarak çevrimiçi ortamlardan ulaşılabilen ders materyalleri olmasına rağmen, Afrika kıtasında bulunan öğrencilerinin büyük çoğunluğunun bu kaynaklardan yararlanmadıklarına yönelik kanıtlar bulunmaktadır. Ayrıca açık ve uzaktan öğrenmenin öğrencilerin önündeki uzak mesafeler, finansal sınırlılıklar ve diğer sosyal problemler gibi yüksek öğretimin önündeki çeşitli bariyerleri ortadan kaldırdığına yönelik araştırmalar mevcuttur. Bu çalışmada amaçlı olarak seçilen üç açık ve uzaktan öğrenme kurumunda eğitim gören öğrencilerin açık eğitim kaynaklarını kullanım durumları ve katılım durumları yansıtılmaktadır. Sonuç olarak öğrencilerin açık eğitim içeklerine sınırlı erişimleri veya hiç erişmemeleri durumu, bu içeriklerin kalite, eşitlik ve erişim konularında öğrencilere yapabilecekleri katkı bağlamında tartışılmıştır. Bu tartışma, öğrencilerin bilgi ve iletişim teknolojilerine erişimlerinin açık eğitim kaynaklarının adaptasyonu ve kullanımı için gerekli olduğu bağlamında sunulmuştur.

Anahtar Kelimeler: Bilişsel buradalık, sorgulayıcı öğrenme toplulukları, açık ve uzaktan öğrenme, açık eğitim kaynakları, sosyal buradalık ve öğretim buradalığı.

About the Author(s)

Ramashego Shila Shorty Mphahlele

Mphahlele Ramashego Shila Shorty obtained Doctor of Education's degree from University of South Africa, Department of Psychology of Education in 2018. She has been employed as a lecturer at University of South Africa, Department of Early Childhood Education. Her interest areas are Information and Communication Technologies, Open and Distance Learning, Open Educational Resources, Mathematics teaching and student support.

Mailing Address: 135 Phudufufu Street, Atteridgeville, 0008: University of South Africa, Early Childhood Education, Pretoria, South Africa, 0008,
E-mail: Emphahrs@unisa.ac.za

Matlala Violet Makokotlela

Matlala Violet Makokotlela is a lecturer at the University of South Africa (UNISA) in the Department of Science and Technology Education. She holds a Doctoral degree obtained from Unisa. Makokotlela's research interest is in curriculum, sustainability education, climate change, Open and Distance Learning and Open Education Resources.)

Mailing Address: 89 Windmill, Mooiklof Ridge, 0048, University of South Africa, Department of Science and Technology Education, Pretoria, South Africa, MatlaVi12,
E-mail: Emakokm@unisa.ac.za

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Negative Aspects of Using Social Networks in Education: A Brief Review on WhatsApp Example

Burak YILMAZSOY[a]
Mehmet KAHRAMAN[b]
Utku KÖSE[c]

[a] burakyilmazsoy@hotmail.com; Researcher, Muğla, Turkey; ORCID: 0000-0001-5462-4247
[b] kahraman@aku.edu.tr, Afyon Kocatepe University, Afyonkarahisar, Turkey; ORCID: 0000-0002-2551-6623
[c] utkukose@sdu.edu.tr, Süleyman Demirel University, Isparta, Turkey; ORCID: 0000-0002-9652-6415

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Review Article

Abstract

The aim of this study is to examine negative effects of using WhatsApp social network application in educational processes and to create a conceptual framework in this manner. In order to examine the literature related to the research topic, sources in different databases were evaluated and research works after especially 2010 have been considered accordingly. A holistic framework regarding negative results of using WhatsApp in education has been tried to be established by examining the sources in detail. There is currently not too many scientific research works on benefits and disadvantages of using WhatsApp in long-term. But since this application has been accepted by many researchers as an instant messaging approach, it appears to be a small number of studies analyzing the effects of over-use of instant messaging take place in the associated literature. When the data obtained within this research is examined it is possible to express that the students addicted to instant messaging are inadequate in academic processes, they cannot control the time spent for messaging, they neglect their homework and they are also less disciplined compared to other students. Additionally, it is also seen these students' comprehension levels, learning skills, productivity and academic achievements have been affected negatively. It is also remarkable that students using instant messaging during reading tasks can increase the time required for completing reading, and may even feel sleepiness during daytime.

Keywords: social media, whatsapp, addiction, negative effects, education

1. INTRODUCTION

Technology affects many areas and provides great convenience in the areas where it is widely used. Thanks to rapidly developed technology, devices are shrinking in terms of physical and hardware, and the internet technologie continues to develop and become more accessible every time (Davies et al., 2017; Schroeder, 2018; Vannoy, & Palvia, 2010). Especially mobile devices and internet technologies are used extensively by the users. At this point, it is possible to indicate that integration of technology into different areas can lead to disadvantages as well as

advantages. This negativity generally results from misuse, overuse and out-of-objective use by users.

Since their first appearance in the technology arena, mobile devices have undergone a strong evolution in terms of appearance and using features. As a result of different development phases, mobile devices have reached the size of 'smart phones' that have gone beyond their basic functions (Cheng et al., 2017; Kiljander, 2004; Thulin, & Vilhelmson, 2017). Along that process, internet usage has always become the first choice of feature in smart phones. Users can use different social communication tools including especially social media (Facebook, Twitter, Instagram, WhatsApp, etc.), thanks to applications installed on their smart phones.

With the spread of smart phones and easy access to the internet, the number of social media users has increased rapidly. In this context, the WhatsApp social network application is widely used in smartphones. WhatsApp was designed by Brain Acton and Jan Koum in 2009, in order to make messaging communication and circulation clearer and faster, thanks to internet and wi-fi technologies keeping users in touch (Harma & Shukla, 2016). WhatsApp allows users to send and receive real-time location information, photos, videos, audio and text messages to other people and groups. All these tasks are done free of charge and thanks to that environment, up to 100 MB of text messages, images, audios, videos, PDF/Word documents, spreadsheets, slide shows and more of different data can be transmitted to target users (Whatsapp, 2019b). WhatsApp also stands out as a powerful social network that can share links to web addresses (Dan Bouhnik & Deshen, 2014), appeal to people of all ages (Zan, 2019) and allow fast communication. WhatsApp is an instant messaging application that can be run on majority of mobile platforms, by being one of the most popular mobile applications worldwide (Priyono, 2016).

WhatsApp social network enables sharing of different-type data and resource, ensuring effective communication and interaction, and even the creating joint activities within created groups (Yılılmazoy & Kahraman, 2018). With this high level of communication and interaction environment, it is seen that higher education institutions have started to adopt mobile technologies to meet the needs and expectations of students (Han & Shin, 2016; So, 2016). It is seen that web technologies are actively used and social media supported learning is becoming more widespread in today's education system, due to the frequent use of internet and smartphone applications among students (Yılılmazoy & Kahraman, 2018). Mobile devices and the associated applications can be used in an educational event, for getting educational content,

finding additional sources of data, searching for specific information, and encouraging interaction as well as communication in peer groups (Echeverria & others, 2011). Here, WhatsApp has a great role in combining all critical and effective features for ensuring good educational experiences in the era of web based teaching / learning.

Thanks to all its effective features, WhatsApp is highly addictive and can have a huge impact on regular users, as well as causing some sideeffects, which are difficult to control and eliminate (Yeboah & Ewur, 2014). WhatsApp is used extensively by students in daily life, by reaching to different areas. In the changing education system, web technologies are actively used and social media supported learning is becoming more widespread. However, if it is not evaluated carefully, this mobile application may have some negative effects / side-effects due to misuse and overuse.

Based on the explanations so far, objective of this study is to examine negative effects of using WhatsApp social network application in educational processes and to create a conceptual framework in this manner. In order to examine the literature related to the research topic, sources in different databases were evaluated and research works after especially 2010 have been considered accordingly. A holistic framework regarding negative results of using WhatsApp in education has been tried to be established by examining the sources in detail. There is currently not too many scientific research works on benefits and disadvantages of using WhatsApp in long-term. But since this application has been accepted by many researchers as an instant messaging approach, it appears to be a small number of studies analyzing the effects of over-use of instant messaging take place in the associated literature.

Considering the topic and the research, the rest of the content is organized as follows: Next section provides information regarding material and methodology infrastructure of this research briefly. After that section, the third section focuses on the research works evaluated and provides brief information about what did they obtain about negative aspects of WhatsApp in educational processes. Following that, the fourth section provides a general discussion with also some suggestions for further research and the content is ended by the final section regarding conclusion and future works planned as following the current study.

2. METHODOLOGY

This study is a literature review which aims to create a conceptual framework by examining the negative effects of using WhatsApp social network in educational processes. The literature

review provides information about the subject of interest and provides a theoretical basis for the research (Buyukozturk, 2009). A typical literature review involves the process of reading, selecting, and critically evaluating current knowledge, ideas, research findings, and discussions to achieve a specific purpose (Ekiz, 2013). In this section, the simple approach followed for data collection and analysis is explained first under the following sub-section. Next, some brief information about the WhatsApp application is given accordingly.

Data Collection and Analysis

In the context of data analysis, research studies published after 2010 were examined by applying a comprehensive enough content analysis. The research studies included within the analysis phase generally include discussions regarding negative aspects of using WhatsApp social network in education. In this context, main focus points of these studies were briefly expressed. In this way, a holistic framework was tried to be formed in accordance with the purpose of the study reported here. For the search in the literature, some simple keywords such as 'whatsapp', 'negative effects', 'negative use', 'social network', 'education', 'teaching' and 'learning' were used to gather some data regarding recent research studies. After getting the whole recent research studies, more consideration have been given to the ones with more citations, more interaction over the Web (i.e. share, view), and being unique in terms of found findings.

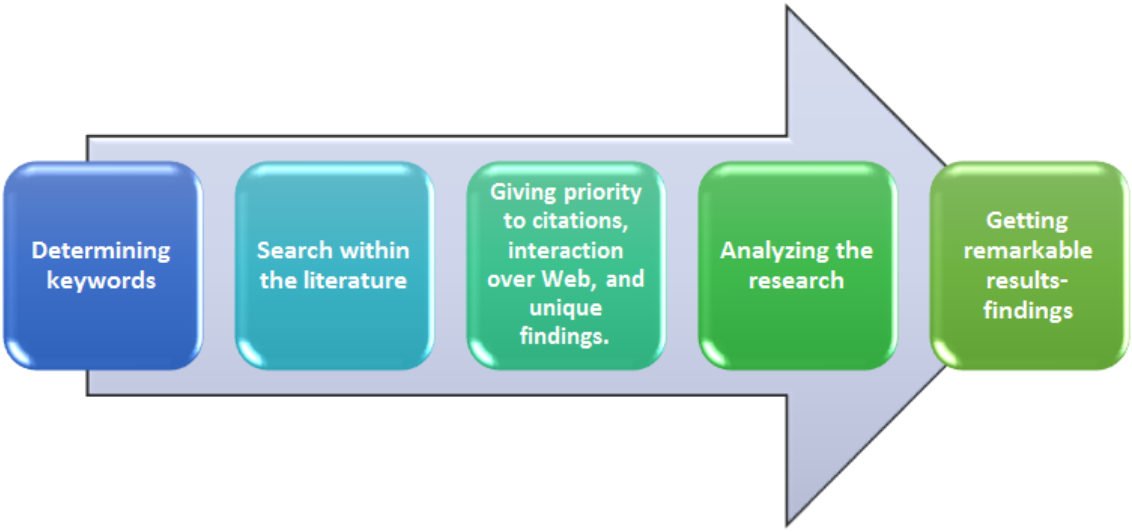


Figure 1. Data collection and analysis phases followed in this study.

3. WhatsApp Application as a Social Network

WhatsApp is an application that offers instant messaging service across platforms within the scope of smartphones (Allagui, 2019). The application, which was launched in 2009, gained widespread use and popularity in a very short time. Today, WhatsApp is known as the most popular social messaging application (We Are Social, 2019).

Thanks to the WhatsApp application that can be integrated and used in many fields such as marketing, health and education, users can communicate and be in-share with their families, friends and colleagues, for free of charge. WhatsApp provides communication through peer-to-peer interaction and in closed, private (members-only) groups. It facilitates interactive, multimedia oriented using features with instant sending of texts, images, audio and video over users' mobile phones (Rosenberg & Asterhan, 2018). It briefly allows creation of groups that enable exchanging of information quickly, sending music, photos and videos and ensuring instant communication in a way that has never been seen before (Souza, 2015). In the context of WhatsApp environment, the whole messages sent when the device is turned off can be forwarded to the user and archived accordingly. WhatsApp serves to establish and maintain one-to-one personal relationships and ensures memberships in social groups (Church & de Oliveira, 2013). Group activities can also be carried out in collaboration with the WhatsApp application. WhatsApp is used not only for exchanging information, but also for entertainment and for communicating with friends and family (Malka, Ariel and Avidar, 2015). Among all critical features, WhatsApp has been a unique type of social networking.

When compared to popular social networking technologies such as Facebook messenger or Google Hangouts, interface of the WhatsApp is simple and easy-to-use (Cheung, Hew, & Ng, 2008). The application, which is also very easy-to-install, allows instant synchronous communication and maximum mobility (since it is installed over mobile phones). In this context, WhatsApp is very accessible to the general population, by including teachers when it is evaluated from an educational perspective (Calvo et al., 2014; Gaur, & Bohra, 2019; Ramzan et al., 2019). It can be used for even distance education processes (Aktas, & Can, 2019; Madge et al., 2019; Saleem et al., 2018; Simui et al., 2018). Furthermore, it can be an assistive tool for life long learning / learning outside of the classroom environment (Aktas, & Can, 2019; Blonder, & Waldman, 2019; Glenda et al., 2019). Unlike social networks like Facebook, it is not required to create a wider personal profile page to use WhatsApp environment. Furthermore, although Facebook allows users to access personal profile information, events,

friend lists, and communicate with other users over different profiles, the same things are not possible over WhatsApp (Sánchez-Moya and Cruz-Moya, 2015).

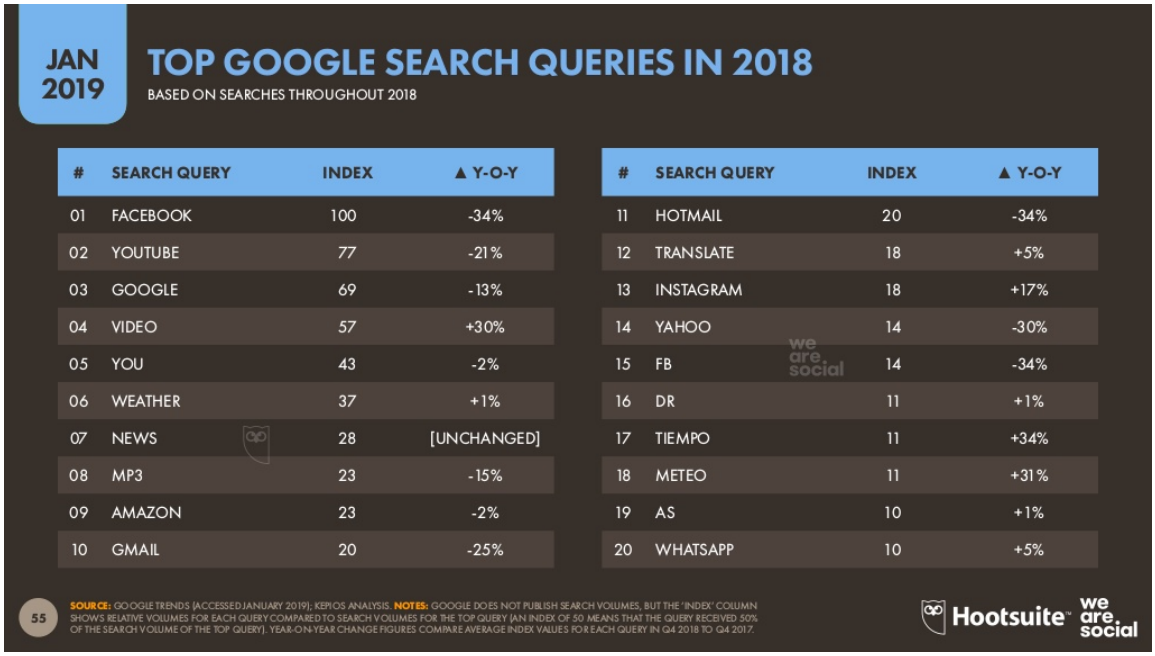
From a general perspective, it is possible to express features of the WhatsApp application as follows (WhatsApp, 2019a):

- It provides easy, reliable messaging environment with free internet connection.
- It allows you to communicate with groups that are important to you (i.e. family or co-workers groups). In the groups, users can share messages, photos, and videos up to 256 people at the same time. It is also possible to name / re-name groups, mute them or set notifications.
- WhatsApp allows communication without interruption and synchronizes all the chats with the computers with by using WhatsApp over Web and the desktop.
- Thanks to voice and video calls, WhatsApp allows communicating with people in different countries for free or low costs (according to the used service provider).
- By running an end-to-end encryption, WhatsApp allows secure communication (for all types of information and files shared) between two peers.
- WhatsApp allows sending photos and videos instantly and enables users to benefit from built-in camera for capturing important moments. At this point, WhatsApp is able to run over even weak-slow connection.
- WhatsApp also allows sending / receiving PDF files, documents, spreadsheets, slideshows and more.
- By using the WhatsApp interface, users can transmit their voice instantly (without needing texting) and record conversations.

As it can be seen from search queries made with the Google search engine (in 2018); the queries for Facebook, Youtube and Google take the first three places. The WhatsApp social network ranks 20th in the list of the most searched applications-environments (Figure 2). When specific applications are removed, intensity of search for WhatsApp will be more visible. It is also noteworthy that the WhatsApp is ranked in the Google search queries even though it is installed in the mobile environment (found within application market).

When the popularity findings are analyzed in the active user dimension, it is seen that the ranking is respectively as Facebook, WhatsApp, Facebook Messenger, WeChat and Instagram for January 2019 (Figure 3). Here, WhatsApp has a great number of active users although it is

more compact and small social network environment according to other applications-social network environments. When it is considered in terms of monthly number of users (including also unique visits, for again January 2019), WhatsApp takes 3rd place in general, and 1st place in terms of instant messaging applications (Figure 4). A similar finding can be seen in also Figure 5.



JAN 2019

TOP GOOGLE SEARCH QUERIES IN 2018

BASED ON SEARCHES THROUGHOUT 2018

#	SEARCH QUERY	INDEX	▲ Y-O-Y
01	FACEBOOK	100	-34%
02	YOUTUBE	77	-21%
03	GOOGLE	69	-13%
04	VIDEO	57	+30%
05	YOU	43	-2%
06	WEATHER	37	+1%
07	NEWS	28	[UNCHANGED]
08	MP3	23	-15%
09	AMAZON	23	-2%
10	GMAIL	20	-25%

#	SEARCH QUERY	INDEX	▲ Y-O-Y
11	HOTMAIL	20	-34%
12	TRANSLATE	18	+5%
13	INSTAGRAM	18	+17%
14	YAHOO	14	-30%
15	FB	14	-34%
16	DR	11	+1%
17	TIEMPO	11	+34%
18	METEO	11	+31%
19	AS	10	+1%
20	WHATSAPP	10	+5%

55

SOURCE: GOOGLE TRENDS (ACCESSED JANUARY 2019); KEPIOS ANALYSIS. NOTES: GOOGLE DOES NOT PUBLISH SEARCH VOLUMES, BUT THE 'INDEX' COLUMN SHOWS RELATIVE VOLUMES FOR EACH QUERY COMPARED TO SEARCH VOLUMES FOR THE TOP QUERY (AN INDEX OF 50 MEANS THAT THE QUERY RECEIVED 50% OF THE SEARCH VOLUME OF THE TOP QUERY). YEAR-ON-YEAR CHANGE FIGURES COMPARE AVERAGE INDEX VALUES FOR EACH QUERY IN Q4 2018 TO Q4 2017.

Hootsuite we are social

Figure 2. Findings regarding top Google search queries in 2018

(Source: https://hootsuite.com).

Figure 3. Ranking for active users all over the world in January 2019

(Source: https://hootsuite.com).

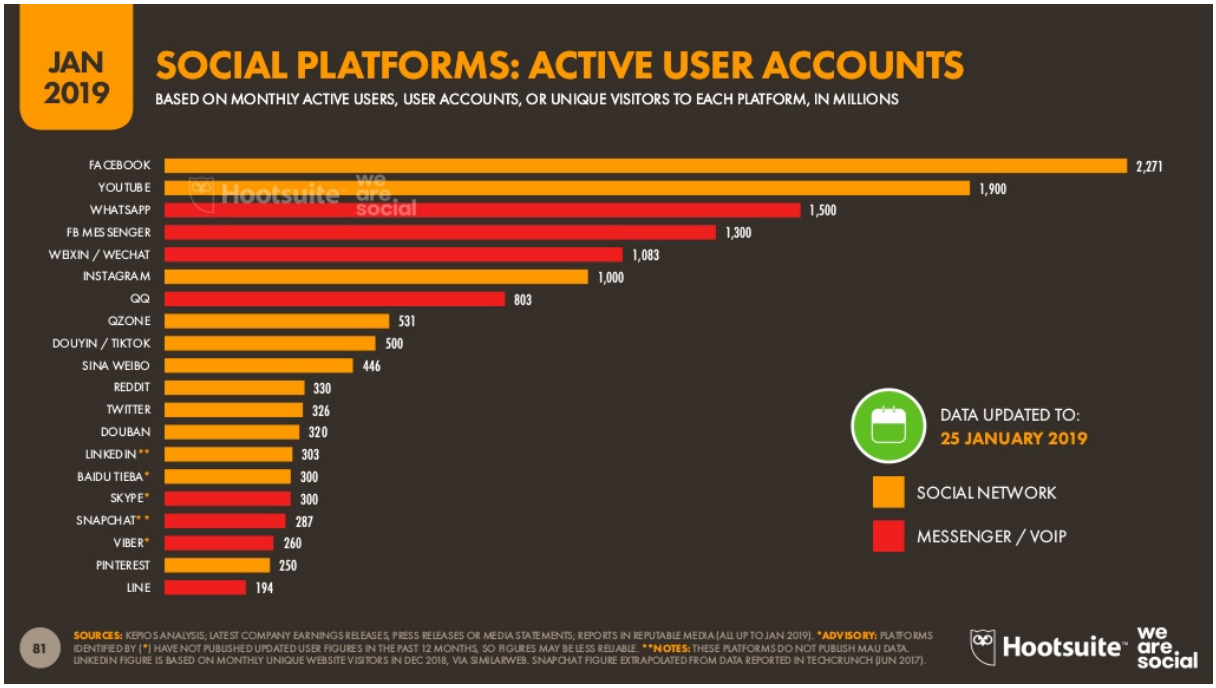


Figure 4. Using ranking considering monthly users and unique visits in January 2019

(Source: https://hootsuite.com).

Figure 5. The most popular messaging applications by country, in January 2019

(Source: https://hootsuite.com).

Considering the expressed features / advantages as well as popularity of it, WhatsApp seems as a powerful tool for educational purposes. The following sub-section is devoted to important points in this manner.

3.1. Characteristics of WhatsApp to be used for Educational Purposes

Using social networks in education facilitates and accelerates educational processes for both teachers and students. Widespread use of WhatsApp (reached around 1.5 billion users worldwide by the end of 2017) (Constine, 2018) made WhatsApp a potential pedagogical tool and a teacher-led virtual learning environment (Lopes and Vaz, 2016). WhatsApp is appropriate tool to be used for educational processes, thanks to its easy usability, high communication and interactive structure (Moran, 2015). Calvo, Arbiol and Iglesias (2014) compared characteristics of 15 different commercial messaging applications by considering potentials as learning environments. They indicated that WhatsApp is the most suitable social networking application for learning and working purposes, with its features such as group conversations, file sharing (especially multimedia), and easy access to speech-conversation history (Calvo et al., 2014).

Using WhatsApp in education enables students to connect themselves to a virtual world and communicate with other students and teachers via mobile devices (Moran, 2013). Advantages

of using WhatsApp (to support teaching-learning processes) include creating groups and sending unlimited messages including different media such as text, images, videos and audio (Souza, 2015). Messages sent via mobile devices are faster, more reliable and more efficient than the messages sent via alternative communication channels (Unesco, 2014). In this context, messages can be confirmed as received / read, as an important indicator for teaching activities (Kaieski, Grings & Fetter, 2015).

Mobile learning refers to the learning process supported by the use of mobile and wireless information or communication technologies (Saccol et al., 2011). Mobile learning makes it possible to use mobile technologies alone or in combination with other information and communication technologies (Unesco, 2014). With WhatsApp, it is possible to form educational processes by being place and time independent.

Although WhatsApp seems as a strong tool for educational processes, it also employs some negative aspects when it is over-used. Although that issue may be seen in all kinds of social networks, the example of WhatsApp should be considered in order to understand better about essential advantages and disadvantages of that application. The next section gives a recent review by considering the literature.

3.2. Negative Effects of WhatsApp: View from the Literature

As it was mentioned before, negative effects – aspects of WhatsApp in educational processes seems to be an open problem and a remarkable research topic, which has not evaluated too much in the literature so far. So, research works especially after the year of 2010 were examined and general / important points in this manner have been taken into consideration in this study. The following paragraph explains each of remarkable research studies briefly and touches to the findings obtained regarding negative effects of WhatsApp mobile application (or it can be also called as a social network) in education.

In his study, Zan (2019) expressed that using WhatsApp social network in education has many benefits. However, in addition to the positive results, negative results such as remarkable number of students sending messages outside of class hours or use of unappropriate language in the WhatsApp messages were observed. Furthermore, it was seen that activating WhatsApp use during educational processes requires high level responsibility to follow all correspondence among students and checking possible errors and giving feedback for corrections in the whole messages send or received by each student. Yilmazoy, Kahraman & Baysan (2019) showed that

using WhatsApp social network in educational processes provided great convenience and ensures positive effects. However, in addition to the positive results regarding use of social networking in educational processes, several negative results such as having internet-based technical problems interrupting teaching / learning processes, increase in addiction to the application use and appearance of too much time wasted because of WhatsApp employment for activities, which may take less time with traditional tools, have been reported accordingly. In the study by Coleman & Connor (2019), it was reported that the use of WhatsApp social network in medical education has many positive effects as well as negative effects. In the context of negative effects, it was indicated that high number of big-sized (in terms of stored data size) visual learning materials may prevent rapid learning (Gon & Rawekar, 2017; Hayward & Ward, 2018), and the literature has already concerns regarding neglect of patient confidentiality when WhatsApp is used along medical education processes (Goyal, Tanveer & Sharma, 2017; Kaliyadan & others, 2016). It is also mentioned that an effective learning process within WhatsApp groups may be affected negatively when an active discussion is interrupted or slowed down because of delays in communication (Kaliyadan & others, 2016). In the review work by Baguma et al. (2019), it was stated that all students are not likely to have smart phones at the same-similar technological level, and WhatsApp groups always have the potential to produce an untraceable volume of data including also non-mandatory useful information at the individual level. In addition, it was explained that students and teachers should be available 7/24 in order to provide feedback for instant questions and opinions within discussions held in big-size groups. In the study by Fondevila-Gascón et al. (2019), it was emphasized that the use of WhatsApp has a high addiction potential due to the feeling of waiting for calls or messages at any time. In the statistical study applied over a specific target group, it was concluded that most of the participants could not give up WhatsApp application while they were doing another activity, and even showed remarkable signs of addiction. In his study, Gurusinga (2018) expressed that using WhatsApp has many positive results in the development of English writing skills. On the other hand, some negative effects were also mentioned as follows: the application is supported only by smartphones and most people still do not have smartphones to use WhatsApp. Also, instant messages have the possibility to be read by other people and a stable, active internet access is always needed for active use of the application. Finally, it is stated that continuous use of WhatsApp can raise an addiction. In the study realized by Hertzog & Swart (2018), it was stated that the internet is not always easily accessible for effective use of WhatsApp application and the duration of calls over WhatsApp may cause negative teaching /

learning outcomes, if they are not optimized – managed efficiently. In the research study provided by Hamad (2017), it was stated that experience was required in preparing special materials for WhatsApp and using alternative software systems supporting the application. Findings from the experiments showed that the students were not always ready at the agreed WhatsApp meeting times and could send messages (to groups or everybody) even late at night. Findings also showed that some students did not participate in the discussions, it was not certain that all students could learn from the same materials, and that WhatsApp application caused some students to tend to participate in the course by just copying and pasting ready texts. In the study by Gon & Rawekar (2017), some disadvantages of using WhatsApp in educational processes are listed as briefly intensive messages causing chaos in teaching / learning processes, time-consuming interaction features that may return as negative effects and eye fatigue as a result of long-time use over mobile phones. In their study, Grover et al. (2016) reported that the use of instant messaging after bedtime causes shorter sleep time, more sleeplessness during daytime and eventually, decreased academic performance, which is a critical issue in terms of educational outcomes. In the study by Yeboah & Ewur (2014), it was stated that using WhatsApp social network in education has negative effects on students' performance as follows: Most of the students in WhatsApp spend very long time and postpone their educational studies. It was also explained that due to the rapid communication processes in the WhatsApp environment, students do not pay attention to the grammar rules (they may even forget the rules) and derive alternative communication ways because of WhatsApp-specific components such as emojis or animated icons. It was also mentioned that the WhatsApp causes lack of concentration in class environment, and raise issues / questions during academic preparation processes trying to balance online activities and face-to-face activities. The study by Dietz & Henrich (2014) showed that using text messaging through learning process does not affect students' learning positively. Rather, text messaging (texting) has been a distraction factor that resulted lower grades for students, who have send messages to each other during lecture time. Fondevila-Gascón et al. (2014) showed that students may lose their accurate sleeping hours, experience lowerings in their consentration level, and encounter with problems in their learning skills and productivity, due to sending and receiving WhatsApp messages (so that keeping themselves focused on that application environment). According to the study findings by Hayati, Jalilifar & Mashhadi (2013), use of mobile devices may lead teachers to play a passive role in the classroom environment and actually teacher-based (physical) interaction is better and more effective than using mobile devices. Fante, Jacobi & Sexton (2013) showed in their study that

students using instant messaging during reading processes may increase the time required to complete their reading tasks. In their study, Zhang, Song & Burston (2011) expresses that the disadvantages of using WhatsApp are likely to cause lack of attention and even forgetfulness. In the study by Junco & Cotten (2011), it was showed that using instant messaging during performing more than one school task had negative effects within the educational process. In their study, Huang & Leung (2009) showed that although students have obtained five kinds of thank-you forms (interpersonal benefit, social service, convenience, information and entertainment), they were unsuccessful and less disciplined along academic tasks and even neglected their homeworks because they cannot control the time they spend in instant messaging. Fox, Rosen & Crawford (2009) indicated that instant messaging negatively affected the academic impact on reading comprehension.

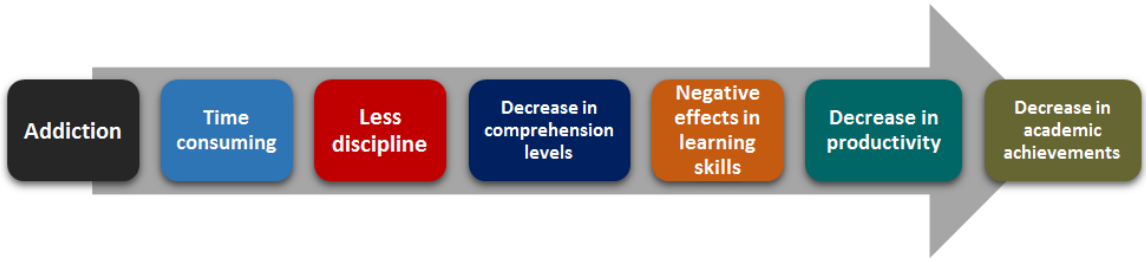


Figure 5. Negative effects of WhatsApp in education.

4. DISCUSSION AND SUGGESTIONS

When the findings of the research are examined, it is possible to reach some main outcomes as general issues regarding negative effects – aspects of using WhatsApp in education. Furthermore, some suggestions for further research can also be derived thanks to currently achieved findings.

Considering the examined literature, the following points can be emphasized in the context of negative effects of WhatsApp use in education:

- Students, who are dependent on instant messaging, may be unsuccesful in academic processes.
- Students are often unable to control the time spent on messaging.
- Students using WhatsApp may neglect their homework and be less disciplined than other students.

- Using WhatsApp during educational processes may adversely affect some students' reading comprehension and academic achievement.
- Negative results such as inability to concentrate, reduced learning skills and productivity may occur in students, who are deprived of sleep due to active WhatsApp use.
- When using WhatsApp in educational processes is preferred, there may be issues such as students may not have a smartphone or internet access, as some kind of also restrictions.
- Receiving too many messages over WhatsApp may negatively affect learning.
- Active topic may be easily left out of account, because of unnecessary comments in WhatsApp environment.
- In WhatsApp groups, students may share posts out of the educational scope.
- In WhatsApp environment, groups may be inactive (as a result of low interaction by students) in time.
- There is not any sanction against non attandance to WhatsApp sessions.
- In WhatsApp environment, some students may not express him / her properly.
- Students may hesitate to ask questions in WhatsApp environment.
- There may be a tension against feeling like being observed in WhatsApp environment.
- Overuse of WhatsApp application may cause distraction.
- Using WhatsApp out-of-purpose and long-time messaging may increase addiction.
- Users may ignore questions / messages send over WhatsApp social network environment.
- Because of WhatsApp, academic boundary between the teacher and the students may be eliminated.
- Using wrong scientific language or missing corrections within WhatsApp environment may cause incorrect learning experiences.
- It was also reported that sharing too many educational materials over WhatsApp application may prevent the learning process.

In the light of the findings obtained in this study, the following suggestions can be expressed:

- Different research studies regarding negative effects of using WhatsApp social network in educational processes can be realized over different demographic groups.

- Research studies can be applied by considering different learning and education levels and comparing the obtained findings in this manner can contribute to the associated literature.
- Qualitative in-depth analysis works regarding use of WhatsApp in educational processes can be done accordingly.
- Using WhatsApp in educational processes can be planned with certain rules and programmes so that disadvantages / negative effects can be eliminated.
- WhatsApp has different using features and interaction ways. All these different features and interactive components can be taken into consideration within organized educational processes, in order to understand more about effects of that application – social network.

5. CONCLUSION AND SUGGESTIONS

In this study, the WhatsApp application, which is a popular mobile instant messaging and more broadly; a social network environment, was examined in terms of negative effects in educational processes. As general, WhatsApp is known as an effective social network tool as well as a strong communication tool, which means it can be used through different kinds of educational processes. Since first influence of online teaching-learning tools within education, there have been many different online or offline tools. But social networking has been the most effective tool among all of them. In detail, instant messaging tools such as WhatsApp have been examined for a while in terms of educational perspective. As the associated literature has more steps to take for detailed findings, there is still a remarkable amount of recent research works to be considered. This study has provided a brief review in this manner and tried to form a conceptual framework as well as essential information regarding negative effects that can be observed during use of WhatsApp in educational environments. When the data obtained during this research are evaluated, it can be seen that WhatsApp may cause the students to be addicted to instant messaging, which is not adequate in academic processes. Additionally, students cannot control the time spent for messaging, they neglect their homework and they become less disciplined. Also, it is reported that WhatsApp may affect students' comprehension levels, learning skills, productivity and academic achievements negatively. The mentioned negative effects are important since they may be analyzed in detail in order to direct effective using features and functions of that application into better educational processes. The authors believe

that this study has been a brief but informative enough reference for anyone interested to evaluate further the educational issues or opportunities regarding WhatsApp use.

In addition to the research realized here, the authors are also highly motivated about some future works. In this context, it was already planned to perform additional reviews in specific periods. On the other hand, there is also a future work plan, which includes preparation of a survey for understanding better about students' and teachers' ideas about negative (or positive) aspects-effects of WhatsApp when it is used in educational processes. Finally, additional works for some future perspective will be performed for giving more idea about how instant social networking environments-tools will shape the future of the education.

Sosyal Ağların Eğitimde Kullanılmasının Olumsuz Yönleri: WhatsApp Örneği Üzerinden Kısa Bir Literatür Taraması

Özet

Bu çalışmanın amacı, WhatsApp sosyal ağ uygulamasının eğitim süreçlerinde kullanılması sonucunda ortaya çıkan olumsuz etkileri incelemek ve bu şekilde kavramsal bir çerçeve oluşturmaktır. Araştırma konusu ile ilgili literatürü incelemek için farklı veritabanlarındaki kaynaklar değerlendirilmiş ve özellikle 2010 sonrası araştırma çalışmaları bu bağlamda dikkate alınmıştır. Kaynaklar ayrıntılı bir şekilde incelenmek suretiyle eğitimde WhatsApp kullanımının olumsuz sonuçlarına ilişkin bütünsel bir çerçeve oluşturulmaya çalışılmıştır. Literatürde halen WhatsApp'ı uzun vadede kullanmanın yararları ve dezavantajları üzerine çok fazla bilimsel araştırma çalışması bulunmamaktadır. Ancak bu uygulama birçok araştırmacı tarafından anlık mesajlaşma yaklaşımı olarak kabul edildiğinden, anlık mesajlaşmanın aşırı kullanımının etkilerini analiz eden az sayıda çalışma literatürde rapor edilmektedir. Bu çalışmada elde edilen veriler incelendiğinde anlık mesajlaşmaya bağımlı öğrencilerin akademik süreçlerde yetersiz kaldığı, mesajlaşma için harcadıkları zamanı kontrol edemedikleri, ev ödevlerini ihmal ettiklerini ve diğer öğrencilere göre daha az disiplinli oldukları sonuçlarına ulaşmak mümkündür. Ek olarak, bu öğrencilerin anlama düzeyleri, öğrenme becerileri, verimlilik ve akademik başarıları olumsuz yönde etkilenmekte, ayrıca okuma süreçleri sırasında anlık mesajlaşma kullanılması durumunda okumayı tamamlamak için gereken süre artırılabilmekte ve hatta gündüz uykusu hissedilebilmektedir.

Anahtar kelimeler: sosyal medya, whatsapp, bağımlılık, olumsuz etkiler, eğitim

About the Authors

Burak YILMAZSOY

Burak YILMAZSOY received his undergraduate degree in 2010 from Afyon Kocatepe University, Department of Computer Technology and Programming. His research interests include distance education, social media, educational technology, educational sciences, educational use of social networks, active and effective learning methods, gamification and new media.

GSM: +90 544 529 33 45
E-mail: burakyilmazsoy@hotmail.com

Mehmet KAHRAMAN, PhD.

Mehmet KAHRAMAN received his Ph.D. degree in Computer Education and Instructional Technology from Anadolu University in 2012. Kahraman is currently teaching at Afyon Kocatepe University, and direct the Department of Computer Education and Instructional Technology as the department chair. Since 2004 he has been managing EU education and training projects. Kahraman has taken part in the opening of ECDL test centers and holds relevant computer certificates. His research interests include distance education, e-learning, digital gamification, project-based learning, 21st century skills, digital fluency, e-citizenship, e-books, social media and e-mentoring.

Mailing Address: Afyon Kocatepe University, Faculty of Education, Ahmet Necdet Sezer Campus, 1st Education Building, 03030, Afyonkarahisar, Turkey
E-mail: kahraman@aku.edu.tr

Utku KÖSE, PhD.

Utku KOSE received the B.S. degree in 2008 from computer education of Gazi University, Turkey as a faculty valedictorian. He received M.S. degree in 2010 from Afyon Kocatepe University, Turkey in the field of computer and D.S. / Ph. D. degree in 2017 from Selcuk University, Turkey in the field of computer engineering. Between 2009 and 2011, he has worked as a Research Assistant in Afyon Kocatepe University. Following, he has also worked as a Lecturer and Vocational School - Vice Director in Afyon Kocatepe University between 2011 and 2012, as a Lecturer and Research Center Director in Usak University between 2012 and 2017, and as an Assistant Professor in Suleyman Demirel University between 2017 and 2019. Currently, he is an Associate Professor in Suleyman Demirel University, Turkey. He has more than 100 publications including articles, authored and edited books, proceedings, and reports. He is also one of the series editors of the Biomedical and Robotics Healthcare Series by CRC Press. His research interest includes artificial intelligence, machine ethics, artificial intelligence safety, optimization, the chaos theory, distance education, e-learning, computer education, and computer science.

Mailing Address: Süleyman Demirel University, Department of Computer Engineering, Faculty of Engineering, Faculty of Engineering, E9 Block, Z-23, West Campus, 32260, Isparta, Turkey
E-mail: utkukose@sdu.edu.tr

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Successful implementation of E-learning in self-financed Higher Education: Experience from Hong Kong

Emily Ng
emily.ng@hkuspace.hku.hk; The Hong Kong University School of Professional and Continuing Education Community College; Hong Kong; ORCID:0000-0002-4725-9752

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Abstract

Digital technologies can reinvent the higher education in 21st century. E-learning introduces change to both the people and the organization on any scale. To keep abreast of the times and making learning fun, one of the self-financed Higher Education Sector in Hong Kong introduced Virtual Reality (VR) and online learning for aviation and healthcare courses. This paper explores the successful implementation of E-learning in a Higher Education sector in Hong Kong. The paper investigates the constraints which affect the successful implementation of E-learning in the sector. It also provides some strategies for academicians in development and implementation of E-learning. Educational leaders can strategically promote and enable E-learning at organizational and individual levels by using Peter Senge's Five Disciplines of Learning Organization (1990). The keys to achieve a learning organization are personal mastery, mental model, shared vision, team learning and system thinking. These five disciplines support and sharpen one another, integrated by systems thinking.

Keywords: elearning, pedagogy, implementation of elearning, learning, school management, learning organization

1. INTRODUCTION

The invention of the computer and the internet has brought tremendous educational change over the last century. Emerging educational innovations and methods, such as MOOC, Blended Learning and Virtual Reality, are radically transforming teaching and learning in higher education. To keep abreast of the times and making learning fun, one of the self-financed Higher Education sector introduced Virtual Reality (VR) and online learning for aviation and healthcare courses. The developed VR contents and online learning break the limitations of time and space, and helps students to reach areas where field study is impossible. The purpose of this paper is to address how the educational leaders can strategically promote and enable E-learning at organizational and individual levels by applying Peter Senge's Five Disciplines of Learning Organization (1990). The five disciplines including personal mastery, mental models,

shared vision, team learning and systems thinking are applied to critically analyze this change of E-learning pedagogies. The challenges and strategies for E-learning implementation will be discussed in the following paragraph.

2. BACKGROUND

The rapid change of technology has a significant impact on teaching and learning. The emergence of online learning to replace or to supplement face-to-face learning will come naturally. All educational sectors around the globe are seeking viable, blended and sustainable modes of online courses (e.g. MOOC, SPOC). One of the self-financed Higher Education sector endeavors to develop E-learning and build up the capability of offering online courses and VR contents. Senge (1990) defines learning organization as a place where people continually expand their capacity to create the results they truly desire, and where people are continually learning how to learn together. The learning disabilities in an organization can be fatal and the emergence of learning organization requires the climate created by five disciplines. Many studies indicated that the educational leaders always encounter many challenges in the E-learning implementation (Shahmoradi et al., 2018; Tarus et al., 2015; Muresan, & Gogu, 2013; Alias et al., 2012). Lack of training, poor awareness programme, poor infrastructure, poor preparation of the academicians and students to use of E-learning and their negative perception are the contributing factors of the failure of the E-learning (Zulfiqar et al., 2018; Shahmoradi et al., 2018; Naziyabanu, et al., 2017). Reshaping the perceptions by academicians and students might also contribute to the success of E-learning implementation (Rodrigues et al., 2019; Shahmoradi et al., 2018). The paper would demonstrate an example of how educational leaders can successfully implement E-learning at organizational and individual levels by applying Peter Senge's Five Disciplines of Learning Organization (1990). The paper may contribute to knowledge around E-learning implementation in a self-financed Higher Education in order to enhance educational practice.

3. DISCUSSION

The Learning Disabilities

Four constraints have the potential to hamper or hinder the E-learning plan in the institution These include:

1. "I am my position" – employees focus only on their position instead of what value they add to the organization goal. Teachers primarily concern they are already overtaxed with current work responsibilities and are not willing to develop new E-learning pedagogies.
2. "The enemy is out there" – when things go wrong, employees blame others rather than examining the root cause of the problem. Staff who are uncomfortable with E-learning may get embarrassment over the difficulty of trying new things. Those with low digital literacy may feel foolish trying to the assistance they need. Fear of going wrong and blame inhibit their leaning.
3. "The parable of the boiling frog" – maladaptation to gradually building threats. Tsunami is coming that will be wipe away any the school that does not adapt to the new technological reality (Patterson, 2016). Online learning is a new and much less expensive technology for learning (Kasraie, & Kasraie, 2010; Deming et al., 2015). In order to survive, higher education will have to come to grips with new technology or risk of obsolescence (Davidson, & Goldberg, 2010). It is problematic when teachers who get used to more traditional classroom approaches may not recognize E-learning is a trend in global educational sectors. In the meantime, they may not align with the school's vision of becoming an internationally recognized the school for high-quality E-learning development. As a result, they are not ready to build up their capabilities in online courses to make the school sustainable in the fast-technological changing environment.
4. "The fixation on events" – people's thinking is dominated by short-term events instead of focus on small continue improvement. Teachers who having conceptual ties to a traditional paradigm which is textbook-based and classroom-based will more resist to change. As a result, teachers may not cohere with the school's aspiration to enhance expansion of new online learning models and approaches (e.g. MOOC, blend mode) suitable for adaptation to the different learning needs of students in different places, like Mainland China and the region.

The Five Learning Disciplines

Personal mastery

Technology has altered the educational landscapes so much that the entire of learning is changing at an unheard of pace (Fok, 2012; Miller & Doering, 2014). Nevertheless, the educational leaders cannot focus solely on technology. At the same time, the leaders have to give equal energy to create a learning culture. Personal mastery implies the employees

continually clarify and deepen personal vision which expand the shared vision through self-understanding, and personal growth (Senge, 1990). Learning organization exists through individual learning. For organization management, the active force is people (Bailey, 2018). Leaders cannot force staff to embark on the path of personal growth. Leaders can foster personal mastery by creating a conducive climate and being a role model by committing to their own personal mastery.

Creating a conducive climate

The school's organizational climate will improve personal mastery in three ways. First, learn every day on the job (Fullan, 2008). E-learning Committee establishes the E-learning culture which initiate academicians to engage in E-learning and support staff to use technology in teaching and learning. Along with basic infrastructure such as network, the important element E-learning system such as Intranet, SharePoint, learning portal and Moodle learning management system is established. It aims to integrate E-learning in employees' careers and make learning directly into everyday work. This is where employees get the reinforcement. With a well-supported system, employees are encouraged to use Net resource and share knowledge. The daily working activities actually involved in E-learning system, so the staff can understand it not from reading it but doing it. It thereby initiates technology being a part of daily work activities and gives them the incentive to enhance their knowledge in adopting technology.

Second, awareness actually drives the change (Parlakkilic, 2013). Through email, trainings and regular staff meetings, the school is spreading information that it is necessary for front-line teachers to establish a pedagogy which best leverages the power of technology to benefit student learning in the 21st century. The school communicates the messages that we need to know about why we are moving to E-learning, why it is good for the school and the staff. Many data support that E-learning would become a main education trend in the future (Ebner & Schiefner, 2010; Rodrigues, 2019; Glenn, 2014). The school facilitates staff to see current reality as it is and identify what is important to them. Personal vision means keying into what you want (Senge, 1990). With increased awareness of the need of moving to E-learning, staff could have a clear vision of how things should be. Academicians are motivated to engage in E-learning as they recognize they play a critical role in leading this ubiquitous, technologically-driven learning environment.

However, a gap will exist between reality and personal vision that causes tension (Senge, 1990). Staff holding personal vision of E-learning development, may find the gap when their personal vision differs from realities that they have insufficient knowledge and skills of adopting E-learning. Creative tension can generate energy for change (Senge, 1990). Ultimately, staff are motivated to learn in active pursuit of continuous improvement and choose to take action. For example, increase digital competency to bring reality into line with the vision. This intrinsic desire to change is a cornerstone of personal mastery (Senge, 1990).

Third, the school creates an incentive for academics to continuously develop digital competency. E-Learning Committee conducts a range of training sessions with different level based on learner digital literacy and interest. It includes Web 2.0, VR content, mobile learning, Virtual Classroom and Webinar. These hand-on trainings have direct implication on employees' job and train the users practically, so employees are motivated to take it.

At the same time, learning experience that results in creating content. Trainings persuades users with a view to increase their digital literacy and so progressively shifting their attitudes towards positive direction. In order to make E-learning a success, cultural change is required about how training and learning starts and, more importantly, how it is delivered (Mitchell & Honore, 2007). These trainings are designed to address specific learning goals such as increase employees' digital literacy and the awareness for the need of moving to E-learning. These interesting and interactive trainings make users find using the E-learning technology less of a chore and more like a discovery. Resistance to change can stem from personal discomfort (Oreg, 2018). According to Technology Acceptance Model (*Venkatesh & Davis, 2000)*, when people perceived ease to use and usefulness of E-learning technology, they would feel more comfortable to try new technology.

Role-modeling

Creating a learning culture requires absolute commitment from the top down (Senge, 1990). Management must communicate and demonstrate its commitment to the learning culture (Senge et al., 2011). The senior management and programme managers are accountable for learning, being selfless or sacrifice for leading the teaching team to manage E-learning. First, they lead by example. The role of academics as teachers as become multifaceted. They see themselves not just a teacher but an innovator to exploit the potential of the E-learning. They demonstrate a high level of participation and enthusiastic commitment in the training sessions and E-learning development. They initiate E-learning in curriculum planning, VR content and online materials.

At the same time, they guide the junior teaching staff through their learning quest and connect them with ideas of willingness to continuous learning and professional development. In this way, the enthusiasm and energy are palpable. When each member of organization gets a genuine sense of commitment to how the team work as a whole, not just for doing the job, no more "I am my position". The team could work in an extraordinary way and create a shared vision of pushing E-learning forward that align with whole the school's developments.

Second, leaders cannot build a learning culture by making it mandatory (Senge, 2012). Employees may feel disrespected when assigned training courses, leading to passive learning (Kim, Kim, & Lee, 2015). The school leaders always emphasize learning is not in top-manner but learner-centered. The academicians are seriously encouraged to complete some E-learning training courses per year in each individual development plan. Voluntary learning echoed with their impulses to learn and expand their capabilities, at their hearts. It empowers them to move learning from passive to a level of engagement or participation.

Mental models

Mental models describe the ingrained assumptions and generalizations people have which influence their action (Senge, 1990). Transforming mental model expands individual capacity to create change.

Reflecting the staff mental model

Having people change their mental models is to have people reflect on their own beliefs (Senge, 1990). Surfacing the staff mental model makes them recognize any resistance to change in our mind. Apart from digital competency enhancement, E-learning Committee conducts workshops on E-learning pedagogical training in order to reflect their belief towards E-learning and improve the actions and decisions that shape school's vision.

In the workshops, the academicians discuss any resistance factors and share situations experienced as difficult in E-learning development in a small group. In this exercise, employees explore their mental models. This mode of inquiry helps people to expose the hidden assumptions (Senge, 1994). The assumptions that underline their practices is examined. Many academicians take non-traditional classroom learning as less effective and less valuable and thus they do not initiate E-learning.

With case studies of E-learning implementations in branch campuses and other organizations, academicians are encouraged to use reflective thinking and self-analysis on how E-learning

differs from traditional learning and what are the costs and benefits of E-learning. The aviation course is a good example. VR simulates various emergency such as in-flight fires and emergency landings for students to execute the emergency procedure in small team. VR technology brings students more sensational learning experience which is impossible on the traditional classroom and textbook-based learning. In this case, E-learning undoubtedly could enhance the teaching process and student learning experience.

With effective use of E-learning technology can increase teacher productivity (Radović-Marković, 2010; Rodrigues et al., 2011; Vargas, 2013; Ngai et al., 2018), reduce workload (Selwood, & Pilkington, 2005) and save cost (Cushard, 2017). Change will happen when value is transformed (Stacey, 2007). Transforming the staff mental models can help them to identify new way of thinking towards E-learning. The chance of success of E-learning absolutely depends on the acceptance and execution of required-change in the thinking and behavior of the users (Parlakkilic, 2013). Staff resist change in the face of uncertain future benefits (Oreg, 2018). When staff recognize the benefits of E-learning it brings to them, students and organization, they could transform the perceptions of E-learning and eventually change to adopt E-learning so the school can keep pace.

Overcome resistance to change

Most academicians acknowledge the significance of E-learning, but they seldom practice it (Thieman, 2008). There is a gap between perception and practice. Change requires moving from the known to the unknown (Cummings & Worley, 2001). E-learning introduces a shift in culture and habits, resistance to E-learning originates mainly from a fear of risk (Ortiz, 2012; Parlakkilic, 2013). As mentioned before, staff always fear of going wrong and blame. If the abovementioned conducive climate is created, staff resistance can be transformed into collaborative learning workplace (Douglas et al, 2017).

The school has to accept the resistance as part of the process and be prepared to deal with it (Sherratt, 2017). Communication, leadership, empathy and support are the strategies for dealing with resistance to change (Cummings & Worley, 2001; Hon et al., 2014). The school develops no blaming culture which is important to provide support and empower employees to embrace change (Sahni, & Kumar, 2012). The working environment should be safe where honest mistakes are forgiven. Staff are initiated to change when they think the organization where it is safe for teachers to create visions and accepts challenge the status quo. Empowering leadership

fosters a trust-build relationship and promotes employees' sense of autonomy which help reduce the resistance to change (Hon et al., 2014)).

The school has to see the situation from employees' perspective and shows empathy and support to allay unfounded fears. Understanding how employees are experiencing change is the first step to overcoming resistance (Sherratt, 2017). Regular meetings with all stakeholders are arranged in order to actively listen their value of E-learning, understand their constraints, exchange ideas and provide supports. Resistance is lower the greater are feeling of security (Kunze et al., 2013; Oreg, 2018).

At the same time, employees will be more willing to share their concerns and fears when they feel that the management are genuinely interested on their feeling. This provides practical information about resistance as well as lay the foundation for the kind of joint problem solving required to overcome the constraints (Cummings & Worley, 2001).

In addition, leaders may place employees with higher levels of dispositional resistance on supportive working groups which are provided both tangible (e.g. extra guidance) and psychological (a sense of security from a supportive safety net) support. Leaders also encourage knowledge sharing and contribution to benefit from the buffering effects of coworker support. Learning community facilitates teacher change (Tam, 2015). This community could support those employees with limited experience of E-learning implementation and little-known technologies to overcome resistance.

Shared vision

Individuals require the skills of personal mastery and mental modeling, whereas an organization has to work to promote a shared vision to its employees. With a shared vision, the members of the organization have a common goal for the organization (Senge, 1990). A common goal is enormously significant for the organization as it gives the direction and energy for learning.

Unearthing shared picture of the future

Information and transparency are central to the success of change (Lozano, 2013). Effective communication about the change can help staff realistically for change (Cummings & Worley, 2001). The senior management provide a diversity of information of E-learning development and unearth shared picture of the future. First, the declining student demographics in coming years will certainly pose challenge to the school, and keen competition among self-financed

High Education institutions is expected. It is inevitable to see further reduction in number of programmes and staff in the school to commensurate with the declining local student enrollment.

Second, the school's vision is to become an internationally recognized institution for high-quality E-learning development. University Grants Commission (2016) published a blueprint document which echoed the school's vision of promoting E-learning. Third, the significant effects of innovation and the associated ideological change on pedagogy urge academicians to rethink the E-learning pedagogy in 21st century.

The senior management makes a regularly deep dialogue with all staff to encourage them to pursue the common goal of developing and expanding E-learning such as providing online courses to Hong Kong, the Mainland and overseas in order to make school sustainable in coming years. At the same time, the global educational sectors are seeking viable, blended and sustainable modes of online courses. The crux of the matter is speed and mode. The school is responding by building up the capability of offering online courses. In the past, some MOOCs were established. The school measures the effectiveness and provides support over time. In a long-term goal, at least a certain portion of the school's course should be in some form of online mode.

By providing staff with a common goal and compelling reason for why change is necessary and worth the effort, the vision can energize commitment to change (Senge, 1994). Staff more committed when they know they are required to achieve the school goals in expected timeline. Most importantly, in order to survive, employees would have to change with times and transform themselves. Employees would have to be readily take it upon themselves to build competencies and gain new skill in the new era of E-learning.

Through skillful discussion, the school manages to bind staff together around a common identity. The senior management emphasizes when all levels of organization share the same vision of high-quality of E-learning development and consequently the school is confident in meeting these challenges and will continue to provide high quality of education. This shared vision fosters staff to have a genuine commitment and enrollment rather than compliance. The aim is to win the hearts and minds of people (Mathews, & Linski, 2016). To succeed, all levels of the organization do positive things towards achieving common goals instead of they are told to do. Beyond the digital competency enhancement, staff are highly motivated to develop E-

learning in order to drive towards a shared goal of making the school sustainable in this challenging environment.

Support from the top

The school does not simply announce the start of the initiative. Instead, make it clear that the management supports the programme, this will increase employees' buy-in and thus participation in the achievement of the goal. First, the school provides resources, for example, sufficient funding is invested for staff training and VR contents and teaching facilities as well as a VR lab has be launched in 2019. Second, the school has hired IT coordinators to support teachers to use of E-learning effectively across the curriculum. Employees are always occupied with their current work responsibilities and when they encounter technical problems, immediate help should be provided. That way, employees would be more likely to support E-learning. Third, learning must be easily available, actively encouraged, time must be available for it (Senge, 2012). In order to facilitate staff learning, the school provides the studying time, sponsorships and infrastructure. If staff are not provided time off during duty for trainings and are supposed to use their personal time, they may not proceed it. Last, the school has launched various strategies with focus on assisting teachers in drawing up and implementing E-learning in curriculum development. Staff piloting MOOCs are provided feedback on how they are doing and ongoing support.

According to change model (Hiatt, 2006), change involves awareness, desire, knowledge, ability and reinforcement. First, the school increases employees' awareness of the need for E-learning development and develops the staff personal mastery. Second, by surfacing and transforming the staff mental model to overcome the constraints, and hence a new way of thinking towards E-learning is created. With a clear and objective shared vision, staff could generate energy to participate and promote the change to drive towards common goals. Third, with the support from the school and adequate knowledge and skills acquired in the trainings, staff is able to implement E-learning. Last, the school gives reinforcement to staff to sustain the change post-implementation. Beyond the change at individual level, all team members have to understand their role in embracing change.

Team learning

Team learning is the discipline by which personal mastery and shared vision are brought together (Senge, 1990). It establishes the skills of groups of people so as to get the larger picture that lies beyond individual perspectives.

Collective intelligence

Team members often interact and work with other teams, thus spreading the learning across teams (Senge, 1994). First, the new collaborations with different programme teams, including the development and results are shared via monthly E-learning newsletter. These newsletters demonstrate how some teachers have been utilizing the E-learning pedagogies and students enrich their learning experiences. Second, awards and recognition are granted to those academicians who are active using E-learning in their teaching and learning activities. The practice sharing of award recipients is published in the E-Learning newsletter and being announced to campus community.

Third, there are experience sharing videos and workshops, through which seconded teachers employed E-learning or attended E-learning conference will provide professional support to other teachers in promoting wider use of E-learning to enhance teaching and learning. In this way, leader act as a teacher. Participating employees can serve as teachers for their fellow employees. It helps team to see gaps, find the solutions, and experience a learning spirit. Fourth, there is a wealth of cases relating piloted E-learning pedagogies pooled by E-learning Committee, from which teachers may draw for experiences sharing or reference. Stories from employees are collected and used to create reality-based simulations and scenarios. Most importantly, the abovementioned learning community is created to give staff an avenue to gather input for developing E-learning content, support each other, swapping experiences, and best practice sharing. These supportive coworkers act as significant interrelated cues for shaping employees' creativity (Hon et al., 2014). By so doing, each team could cultivate the capacity of members to work together with other groups and team learn to think insightfully about complex issue of implementation of high-quality E-learning, using the ability of many minds working together outgun a single mind.

Systems thinking

System thinking integrates all five disciplines which are interconnected and interdependent (Senge, 1990). System thinking is the focus of learning organization where people continually

expand their capacities to improve the organization as a whole. Leaders need insights into current reality as well as picture of future toward which they are moving. For example, if leaders only measure the outcomes such as the number of online programmes established whereas the learning culture is never created, it is more likely compliance for training and job complement rather than commitment occurs. Therefore, it stops improving the organization as a whole in long term.

Leaders have to look at it from a holistic viewpoint rather than small unrelated manageable parts (Senge, 1990). From a holistic viewpoint, working on change is not solely working on the content of change, nor solely on the organization of change, but also the personal dimensions of change (Morrison, 1998). If the employees themselves are not sufficiently motivated to align with the goal of the school, it is no use to the hardware provision.

System thinking is thinking the organization as a whole, as a system, where single components affect the other elements of the set (Senge, 1990). When entire members of organization felt valued about E-learning, developed the ultimate intrinsic desires to change and a shared vision to guide their work as well as engaged as team to learn and work together, the team would result in extraordinary productivity. That way, small changes can produce big result. It is vital to improve organization as whole. System thinking is leverage (Senge, 1994).

4. CONCLUSION AND SUGGESTION

Digital technologies can reinvent the higher education in 21st century. E-learning introduces change to both the people and the organization on any scale. The educational leaders always encounter many challenges during the implementation of E-learning. In this paper, the constraints and strategies for E-learning are addressed. This paper also demonstrates how the educational leaders can strategically promote and enable E-learning at organizational and individual levels by using Peter Senge's Five Disciplines of Learning Organization (1990). The keys to achieve a learning organization are personal mastery, mental model, shared vision, team learning and system thinking. These five disciplines support and sharpen one another, integrated by systems thinking. When people execute the discipline of personal mastery, they experience progressive changes. The management cultivates personal mastery by creating a conducive climate including staff training and infrastructure as well as being a role model by demonstrating an enthusiastic commitment in E-learning development. Ultimately, employees

build their capacities and intrinsic drive towards continuous improvement by learning. At the same time, employees are encouraged to examine their mental models and identify a new way of thinking towards E-learning through various trainings and dialogues with the management. When the constraints such as fear of risk are overcame, employees are more likely to dare to change. With shared vision**,** people can see how their actions contribute to changing and shaping their future. Employees share the common goal of providing high-quality E-leaning development in order to make the school sustainable in this challenging environment. With a common goal, they would add commitment in organization. All three disciplines develop the basis for team learning**,** which helps team members to create results they desire, at a level beyond their individual capability. The team members learn with each other to build their individual and collective intelligence. Systems thinking underlies all four other disciplines to help the staff see the big picture and their roles in it, and leverage in complex situations. The management focuses on the big picture instead of seeing mere sections. Effective communication, leadership and support is key to win the heart and mind of people as well as to engage with people to create the energy necessary to drive the change. The chance of success of E-learning would continuously increase with the crucial mass of organizational members who developed ultimate intrinsic desire to change and expand their capacities. Finally, the author believes teachers' love to students is the fundamental driving force to overcome all the resistance when E-learning is launched.

E-öğrenmenin kendini finanse eden yükseköğretimde başarılı bir şekilde uygulanması: Hong Kong deneyimi

Özet

21. yüzyılda dijital teknolojiler yüksek öğretimi yeniden yapılandırabilir. E-öğrenme hem bireysel hem de kurumsal anlamda dönüşüm gerektirmektedir. Zamanın gereklerine ayak uydurmak ve öğrenmeyi eğlenceli hale getirmek için Hong Kong'daki yüksek öğretim sektörlerinden biri, havacılık ve sağlık konuları ile ilgili derslerin öğretimi için çevrimiçi öğrenme ve sanal gerçeklik uygulamalarını tanıtmışlardır. Bu çalışmada Hong Kong'da yüksek öğretim seviyesinde uygulanan başarılı e-öğrenme uygulamalarını incelenmiştir. E-öğrenme uygulamalarından başarıyı etkileyen faktörler belirlenmeye çalışılmıştır. Ayrıca e-öğrenme içerikleri geliştiren ve uygulayan akademisyenler için faydalı stratejileri ortaya konulmuştur. Eğitim yöneticileri, Peter Senge'nin geliştirdiği öğrenme organizasyonları için beş disiplini (1990) temel alarak bireysel ve kurumsal olarak e-öğrenmeyi destekleyebilirler. Öğrenme organizasyonlarının başarılı olmasındaki anahtar kavramlar; kişisel uzmanlık, zihinsel model, ortak vizyon, takım öğrenmesi, sistemsel düşünme şeklinde sıralanabilir. Bu beş disiplin sistemsel düşünme ile entegre bir şekilde birbirlerini desteklemektedirler.

Anahtar kelimeler: e-öğrenme, pedagoji, e-öğrenmenin uygulanması, öğrenme, okul yönetimi, öğrenme organizasyonu

About the Author(s)

Emily Ng

Emily Ng has got bachelor degree and master degree from the Chinese University of Hong Kong, Faculty of Medicine. She has been being a health care educator over a decade. Her teaching and research interests includes E-learning, pedagogy, student engagement and health care.

Mailing Address: The Hong Kong University School of Professional and Continuing Education Community College, 28, Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong.
E-mail: emily.ng@hkuspace.hku.hk

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Mobile Learning in Turkey: Trends, Potentials and Challenges

Gönül ÖZSARI[a]
Abdullah SAYKILI[b]

[a] gonul.ozsari@gidatarim.edu.tr; Konya Food and Agriculture University, Konya, Turkey; ORCID: 0000-0002-4175-3389
[b] asaykili@anadolu.edu.tr, Anadolu University, Eskişehir, Turkey; ORCID: 0000-0001-7754-6755

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Abstract

Several components of learning including learners, teachers, schools, learning methodologies, learning content and evaluation criteria are affected by changing technologies. Like other technology-based learning methods, mobile learning is also a product of a period in which new technologies and education are intertwined. As new learning and technologies become more personalized, learner-centered, connected, portable and ubiquitous, skills such as cooperation, communication, critical thinking and creativity start to stand out. Mobile learning has a potential to address these skills and better cater for today's digital native learners thanks to the aforementioned affordances. This potential of mobile learning is the starting point for this study. The aim of this study is to see the trends of mobile learning over the years and to discuss its potentials and challenges. In line with this purpose, the graduate theses published in Turkish Higher Education Council Thesis Database between 2010 and 2019 were reviewed by content analysis method. The results of the study revealed that mobile learning in graduate studies offer the potentials to positively effect on academic achievement, facilitate positive attitude towards mobile learning, increase motivation and develop positive attitude towards the course. In addition, the results also demonstrated that mobile learning is time and place independent, easy, fun and helpful for vocabulary learning and increasing interaction. However, there were also challenges reported associated with mobile learning such as technical and infrastructural problems and lack of hardware and software used in mobile leaning tools.

Keywords: Mobile learning, Turkish Higher Education Council, Turkish thesis database, Content Analysis, Mobile language learning (MALL), Literature Review

1. INTRODUCTION

Once technology and the internet began to affect the field of education, many changes occurred in the creation, storage, distribution of information as well as in the ways to access information (Desai, Hart & Richards, 2008). Some components of education such as learners, teachers, schools, learning methodologies, content, and the issue of evaluation have also been influenced. Firstly, the capabilities and surroundings of learners have improved. Today's learners have been called "digital natives" because they spend most of their time on computers, games, the internet, mobile devices, texting and social media (Prensky, 2001). Unlike their predecessors, they have grown up in an environment where digital technologies are rapidly evolving and spreading. Living in a technology-rich environment has led them to be different from previous generations

called “digital immigrants.” Compared to digital immigrants, digital natives are more enthusiastic about accessing the information quickly, more multi-tasking and more impatient with long-term lessons and teach-and-test assessments (Prensky, 2001). Secondly, teachers have also changed due to the advent of technology and the internet. While they were in the center of the learning process in the past, they are now frustrated at their students’ demands and displeasure (Trilling & Fadel, 2009). Raised in a traditional environment and longing for the past, these digital immigrant teachers have turned into part-time learners of their digital native students to survive in the technology-rich era (Trilling & Fadel, 2009). In such an atmosphere, where digital natives and digital immigrants live together, both the learners and teachers are likely to have some kind of culture shock and generational clash (Tapscott & Williams, 2010). To get over this shock, teachers should try to keep up with their students instead of waiting for students to comply with their old-fashioned methods (Prensky, 2001). Thirdly, the concepts of school and learning have changed, as well. Although schools were the only places for getting information from an authority and socialization, they start to exceed their limits thanks to the internet nowadays. Traditional brick-and-mortar face-to-face learning are being accompanied or even replaced by other time and place independent learning methods such as open and distance education, computer-assisted learning, e-learning, mobile learning and seamless learning. In other words, learning is not about schooling with formalized and institutionalized systems anymore (Ryu & Jeong, 2019). In addition to the concepts of school and learning methods, content and evaluation standards are under serious changes. Digital and technological topics such as software, hardware, robotics, genetics, and nanotechnology are now taught beside the traditional curriculum (Prensky, 2001). Harari (2018) also underlined the importance of teaching necessary survival skills against constant changes in the future and skills to deal with unusual situations. Lastly, the changes in learning and content have opened the way for changes in evaluation methods. For digital native learners with various thinking styles, learner-centered evaluations, and dynamic evaluations where teaching and assessment occur simultaneously are gaining importance over classical knowledge-based exams (Tarighat & Khodabakhsh, 2016).

Consequently, in such an atmosphere of changes in the concepts of information, learners, teachers, school, methodologies, content, and evaluation, it will not be effective to offer learning experiences for today's digital native learners with a traditional education system designed for digital immigrants. In this sense, learners need to be provided with new

opportunities brought by new technologies, thereby helping learners to make learning a lifestyle instead of limiting their learning only to school. This study mentions mobile learning as a tool for learning that has the potential to exceed limits of learning since it is time and place independent thanks to being a product of technological advancements. Thus, the graduate theses published in Turkey on mobile learning were analyzed via content analysis to discover the potentials and challenges of mobile learning. The present study aimed to investigate and report the trends, potentials and challenges associated with mobile learning within the Turkish context.

2. MOBILE LEARNING

Digital natives' desires and needs today are considered to vary from digital immigrants of the past. Thus, a diverse, interactive, cooperative, creative, and innovative learning process will be more applicable than a uniform education system (Trilling & Fadel, 2009). Thanks to being portable, spontaneous, personalized, pervasive, and ubiquitous (Kukulska-Hulme, 2005), mobile learning appeals to today's learners. Popular mobile learning tools are listed as mobile phones, smartphones, PDAs, tablets, laptops, and personal media players (Kukulska-Hulme, 2005). Besides, mobile learning includes not only the mobility of tools but also the mobility of learners (El-Hussein & Cronje, 2010).

Mobile learning has revolutionized education systems since it has gone beyond the use of fixed and stable communication resources and tools in traditional learning (El-Hussein & Cronje, 2010). Like mobile learning, new learning methods and technologies are crucial in addressing to new learning styles because they are characterized by their user-centered, portable, durable, ubiquitous, and networking features (Sharples, Taylor & Vavolua, 2005).

Mobile learning draws attention with its various advantages such as ease of access to content and learning materials, improving learning, identifying the needs and behaviors of the learner, suitability for institutional goals, cost-effectiveness, bringing physically distant learners together, communicating more easily and comfortably, discovering and communicating in different contexts through various interactive technologies, offering learners the opportunity to learn outside the classroom, and providing learning opportunities for disabled learners (Kukulska-Hulme, 2005; Huang, Jeng & Huang, 2009; Sharples et al., 2009; Briz-Ponce et al., 2017; Al-Emran, Elsherif & Shalaan, 2015).

Offering a new dimension for learning, mobile learning seems to have a significant potential to enrich the learning experience for both learners and teachers. It can be predicted that the future

generations will be able to use new digital technologies easily, make friends in the virtual world and learn outside the classroom with the help of these technologies. These learners will have a large repertoire of technological tools with various speeds, processing power, and output in the future (Laouris & Eteokleous, 2005). In such an environment, mobile learning will be a function not only of time but also of the momentary and dynamically developing technologies (Laouris & Eteokleous, 2005). Given these, it is important to know the current trends of mobile learning to predict its future trends and potentials.

To determine the current trends and the future uses of mobile learning applications, it will be useful to examine the studies on the subject. Thus, conducting a content analysis mobile learning will contribute to knowledge-building in the field, and assist policymakers as well as practitioners on ways to how best to exploit mobile learning to create enriched learning experiences. In the Turkish context, there are a variety of studies using a context analysis method on mobile learning. Cevahir and Özdemir (2015) reviewed articles on mobile learning for people with disabilities between 2005 and 2015. Solmaz and Gökçearslan (2016) analyzed 47 studies including theses and articles between 2015 and 2019. Yıldız Avcı (2018) analyzed theses and articles published between 2008 and 2018. Şeylan (2018) analyzed theses and articles between 2005 and 2016. Uygun and Sönmez (2019) analyzed 31 studies consisting of theses and articles published between 2010 and 2017. Korucu and Biçer (2019) reviewed 24 articles published between 2010 and 2017 and Kavaklı and Yakin (2019) analyzed 44 articles published between 2015 and 2019. Besides, Sönmez (2019) examined a total of 40 studies consisting of theses and articles published between 2009 and 2018. Aydoğdu (2019) analyzed 47 theses and 180 articles published between 2006 and 2018.

This study aims to examine trends, potentials and the challenges of mobile learning in education in the Turkish context. To serve this purpose, the graduate theses published in the Turkish Higher Education Council (YOK) Thesis Database between 2010 and 2019 were reviewed and analyzed by the content analysis method. It is thought that this study will contribute to the literature by analyzing more recent theses than previous studies. This study seeks to find answers to the following questions:

1. What is the type of graduate theses on mobile learning published in the Turkish Higher Education Council (YOK) Thesis Database and their distribution over time?
2. What disciplines and education levels are the graduate theses conducted in?
3. What are the samples of these graduate theses?

4. What are the methodology trends in these graduate theses?
5. What potentials and challenges are reported on mobile learning?

3. METHODOLOGY

This study aims to examine the trends, potentials and challenges of mobile learning in the context of Turkey. In alignment with the purpose of this study, a total of 92 theses published in the Turkish Higher Education Council (YOK) Thesis Database between 2010 and 2019 were reviewed. These theses were accessed using "mobile learning" and "mobile-assisted language learning" keywords. The data in the theses were analyzed by using the content analysis technique which is one of the qualitative research methods. Content analysis is defined as the transformation of data into findings by making meaningful inferences from the data (Patton, 2002; Krippendorff, 2018). In addition, content analysis is also about making sense out of the whole data by creating patterns, categories, and themes and reducing the big amount of data to their core meanings (Patton, 2002).

4. FINDINGS AND DISCUSSIONS

In this study, the use of mobile learning in the field of education in the Turkish context was examined by reviewing the data obtained from the graduate theses in the Turkish Higher Education Council (YOK) Thesis Database. In this part of the study, the type of graduate studies on mobile learning, their distribution over time, the disciplines, education levels, samples, methods in these theses, and the potential benefits and challenges of mobile learning will be presented.

4.1. Findings about the types of graduate theses and their distribution over time

In alignment with the purpose of this study, the types of graduate studies are examined as a first step. Figure 1 shows the types of graduate studies conducted on mobile learning between 2010 and 2019 in the Turkish context. It was found that of 92 theses, 15 of them (16%) were doctoral theses and 77 of them (84%) were master's theses (Figure 1).

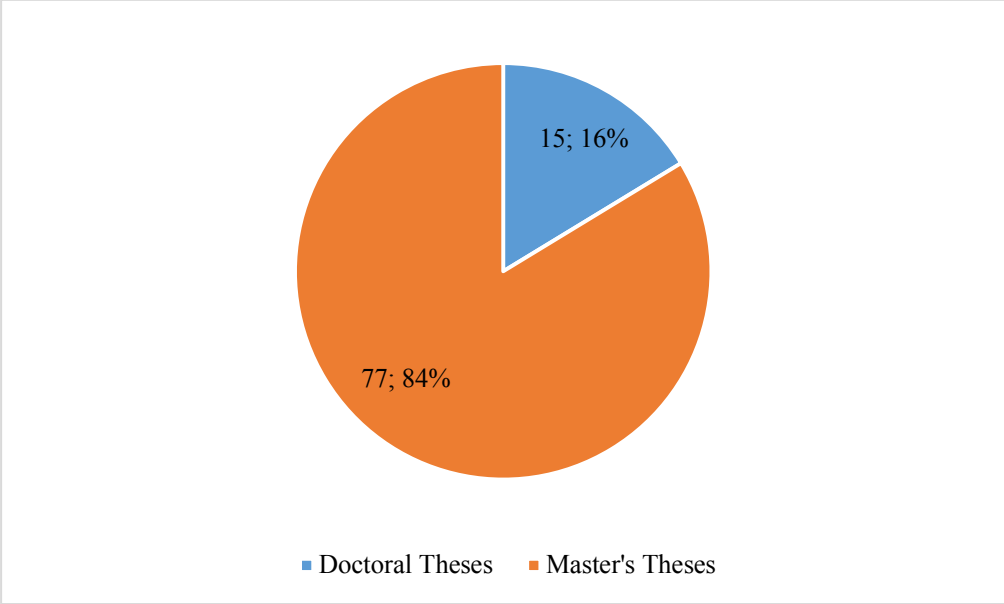

Figure 1. The types of graduate theses on mobile learning

After determining the types of graduate theses, their distribution over time was also examined. Figure 2 shows the distribution of the studies on mobile learning over the years of 2010 and 2019. This figure shows that the number of studies on mobile learning increased gradually over the years (Figure 2). While the number of theses conducted between 2010 and 2013 was less than in the following years, a considerable increase was observed in the theses done since 2014 (Figure 2). Especially 2018 was the year when most graduate studies were conducted on mobile learning. Such an increase over the years gives a clue about mobile learning, its potentials and a growing interest in it. In addition, the fact that the studies on mobile learning have gained importance over the years is consistent with the findings of the studies conducted by Sönmez (2019) and Aydoğdu (2019).

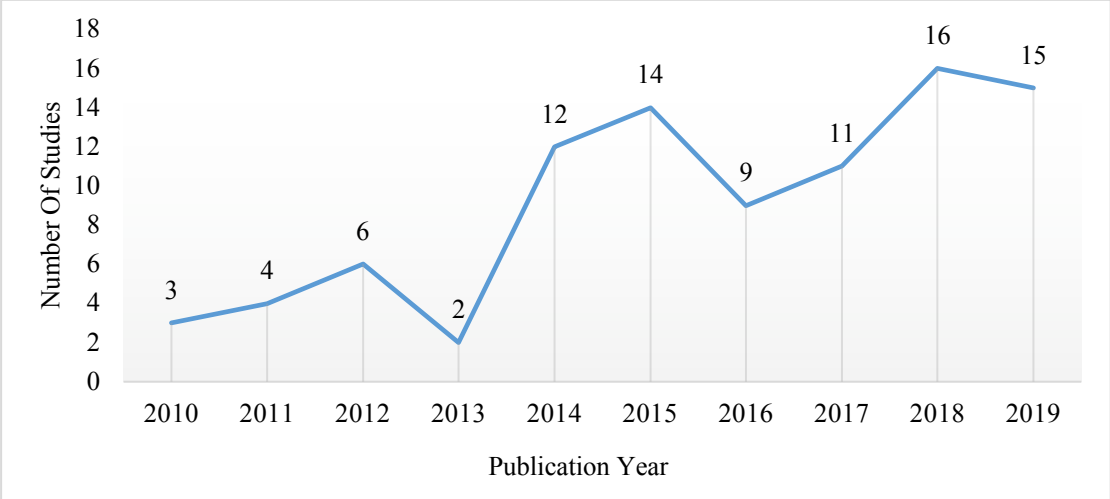

Figure 2. The distribution of graduate theses over time

4.2. Findings about the disciplines and education levels in the graduate theses

The second research question of this study aims to find out the disciplines and educational levels the graduate studies conducted in. Figure 3 shows the disciplines the theses conducted in. Figure 3 reveals that more than half of the 92 studies (52%) were conducted in the field of educational sciences. 25% of the studies were done in the field of social sciences. However, 19% of the studies were conducted in natural and applied sciences and 2% in health sciences. All these findings demonstrate the popularity and potential of mobile learning in the educational sciences.

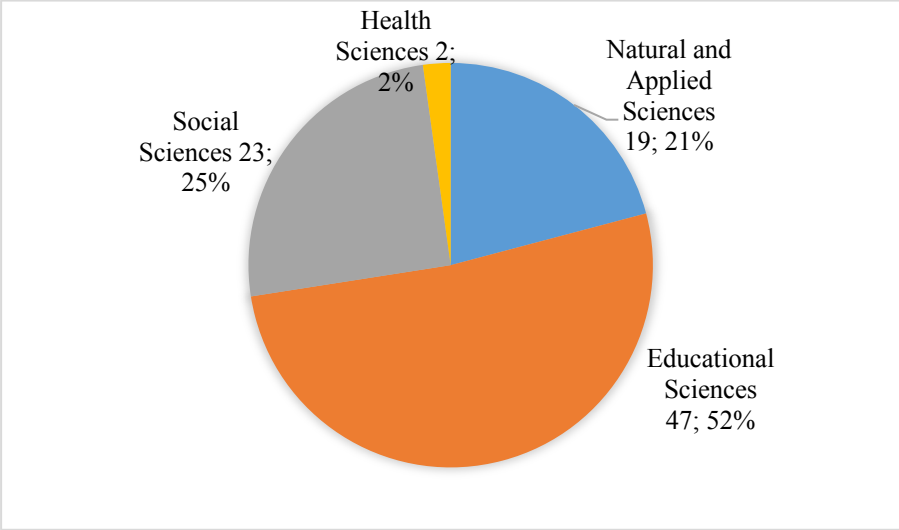

Figure 3. The disciplines in the graduate theses

The educational levels of the theses provide us with the current status and future potential of mobile learning. Figure 4 shows the educational levels of graduate studies on mobile learning. According to the figure, most of the studies were conducted at the higher education level (69%), while 25% were conducted at the K12, including kindergarten, primary and secondary schools. Since 5% of the studies were meta-analysis and content analysis, they were examined in the "other" category. Only 1% of the studies were conducted on corporate training in the GSM sector.

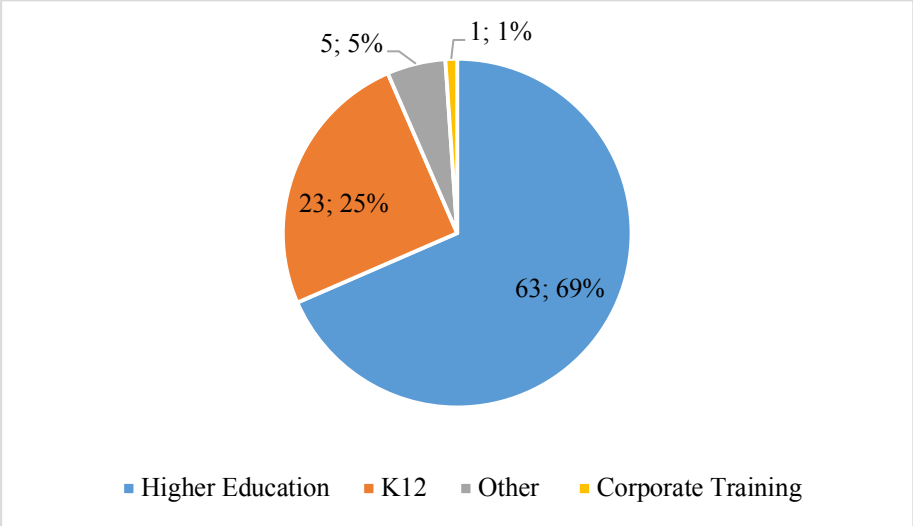

Figure 4. The educational levels of the graduate theses

4.3. Findings about the samples in the graduate theses

The third research question aims to find out the samples the graduate studies are conducted on. Figure 5 shows the samples on which the graduate studies were conducted. The results showed that most of the studies were done with undergraduate students (51%). However, the number of studies conducted with secondary school students (14%) and primary school students (8%) is relatively small. These are followed by the "other" category that includes studies with different samples (e.g., both teachers and students in one study) and studies that did not specify their samples. Following these, the samples of teachers (4%), academicians (3%) and corporate contexts (3%) also stood out. Finally, the number of studies such as meta-analysis and content analysis is 6%.

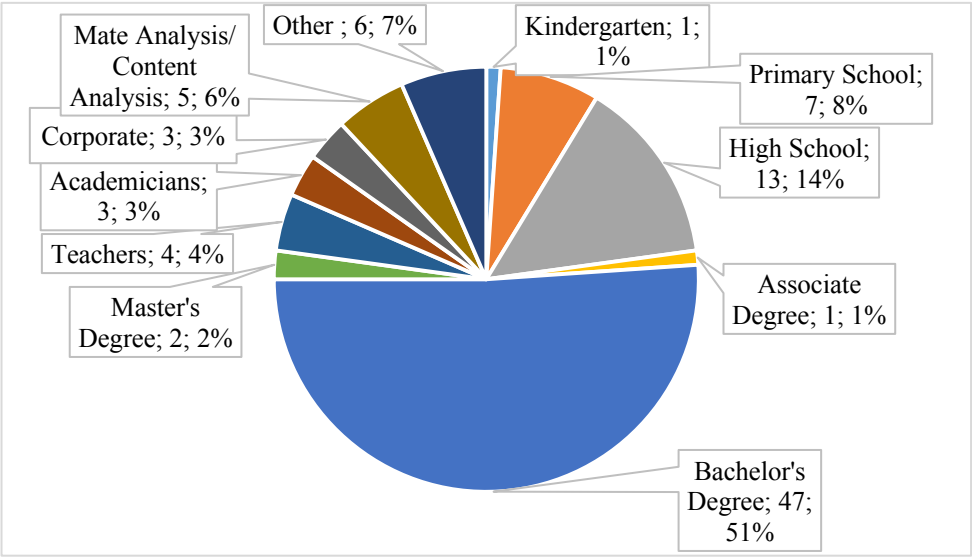

Figure 5. The samples in the graduate theses

4.4. Findings about the methodology employed in the graduate theses

Another aim of this study is to find out the methodology used in graduate studies on mobile learning. Figure 6 shows the research methods used in graduate studies. Accordingly, 52% of the theses were conducted using quantitative methods. Mixed methods were used in 34% of the studies while qualitative studies were used in 14% of the studies.

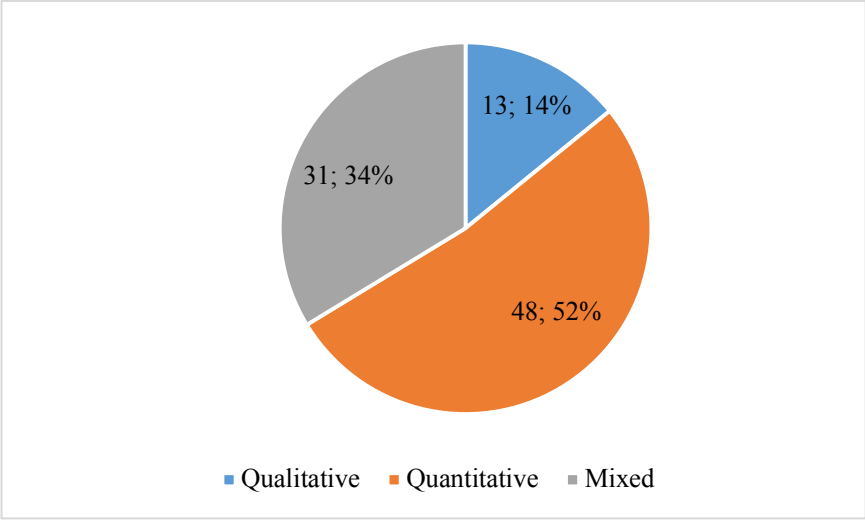

Figure 6. The methodology employed in the graduate theses

4.5. Findings about the potentials and challenges of mobile learning

Finally, this study attempts to describe the potentials and challenges of mobile learning. Table 1 and Table 2 show the potential benefits of mobile learning with quantitative and qualitative data, respectively. Table 1, which includes quantitative data, reveals that mobile learning had a positive effect mostly on academic success (n=30). In addition, it was also indicated that the learners had a positive attitude towards mobile learning (n=17) and positive perceptions about mobile learning (n=6). Furthermore, mobile learning has a positive effect on the motivation of learners (n=14). In some other studies, positive attitudes towards the course are also reported as a potential of mobile learning (n=7).

The results also demonstrated that mobile learning has a positive effect on retention (n=6). Four of the studies are related to the acceptance of learners' mobile learning tools in their educational lives. Other potentials of mobile learning can be listed as having a positive effect on the satisfaction levels (n=3) and technology and mobile learning literacy (n=2), developing self-efficacy of learners about the use of mobile learning tools (n=2) and helping learners recall words they learned (n=2). Finally, the use of Massive Open Online Courses (MOOCs) in mobile learning was examined in only 1 of the studies.

Table 1

Quantitative data: the potentials of mobile learning

Educational Potentials and Number of Studies	**Studies**
Academic Success 30 Studies	Sönmez, 2018; Demir, 2014; Yıldız Avcı, 2018; Erikli, 2018; Şeylan, 2018; Özel Erkan, 2016; Yeşil, 2015; Elçiçek, 2015; Yechshzhanova, 2014; Korkmaz, 2010; Korkmaz, 2010; Çelik, 2018; Yıldırım, 2012; Dinç, 2018; Baş, 2015; Dehmenoğlu, 2015; Erdemci, 2015; Yetişir, 2019; Tanır, 2018; Yokuş, 2016; Ozan, 2013; Çelik, 2012; Özer, 2017; Gülcü, 2015; Ersoy Özer, 2017; Bolatlı, 2018; Kalınkara, 2017; Körlü, 2017; Küçük, 2015; Çavuş Ezin, 2019
Positive Attitude towards Mobile Learning 17 Studies	Yıldız Avcı, 2018; Bozkan, 2018; Kantaroğlu, 2017; Gürkan, 2017; Vatansever,2015; Elçiçek, 2015; Su Tonga, 2015; Saraç, 2014; Korkmaz, 2010; Güven, 2019; Sarı, 2019; Korkmaz, 2019; Khurmyet, 2016; Yetişir, 2019; Yokuş, 2016; Demirer, 2017; Doğan, 2016

Motivation 14 Studies	Okumuş Dağdeler, 2019; Çevikbaş, 2019; Su Tonga, 2015; Khachan, 2019; Alioon, 2016; Ozan, 2013; Özdemir, 2015; Tutal, 2016; Ekici, 2018; Özer, 2017; Gülcü, 2015; Bolatlı, 2018; Köse, 2017; Büyükbeşe, 2019
Positive Attitude towards the Course 7 Studies	Çinar, 2019; Yallıhep, 2018; Yıldırım, 2017; Alioon; 2016; Ozan, 2013; Bolatlı, 2018; Küçük, 2015
Positive Impact on Retention 6 Studies	Akın, 2014; Ozan, 2013; Ersoy Özer, 2017; Gümüş, 2017; Kalınkara, 2017; Doğan, 2016;
Positive Perceptions on Mobile Learning 6 Studies	Bostan, 2018; Küle, 2012; Kuşkonmaz, 2011; Çevikbaş, 2019; İlçi, 2014; Aygül, 2019;
Acceptance of Mobile Learning Tools 4 Studies	Bostan, 2018; İlçi, 2014; Khachan, 2019; Özer, 2017
Satisfaction 3 Studies	Kavruk, 2018; Özdemir, 2015; Zengin Ünal, 2015
Mobile Self-Efficacy Beliefs of Using Mobile Learning Tools 2 Studies	Şener, 2016; Ak, 2018
Positive Effect on Technology Literacy and Mobile Learning 2 Studies	Vatansever, 2017; Özdemir, 2015
Positive Effect on Vocabulary Recall 2 Studies	Çakmak, 2014; Doğan, 2016
Use of MOOCs in Mobile Platforms 1 Study	İşgör Şimsek, 2015

Table 2 demonstrates that learners viewed mobile learning as time and place-independent (n=11). Learners reported positive opinions about mobile learning (n=10). Additionally, learners stated that mobile learning was easy to use (n=8), fun (n=7), flexible (n=4), interesting (n=3), engaging (n=3) and easily portable (n=2). Moreover, mobile learning was found to help vocabulary learning (n=11), learning in general (n=5), increase learner-learner and learner-teacher interaction and support collaborative learning among learners (n=5). It was also found

that mobile learning is effective in scientific process skills (n=1), reducing anxiety about use of technology (n=1) and raising awareness about mobile learning tools (n=1).

Table 2.

Qualitative data: The potentials of mobile learning

Time and Place-Independent 11 Studies	Sarı, 2012; Tanrıverdi, 2011; Tutal, 2016; Aksoy, 2012; İlçi, 2014; Özdamar Keskin, 2011; Özer, 2017; Bolatlı, 2018; Kalınkara, 2017; Zengin Ünal, 2015; Güven, 2019
Positive Opinions towards Mobile Learning 10 Studies	Efe, 2014; Tanır, 2018; Yokuş, 2016; Çelik, 2012; Ağca, 2012; Demirer, 2017; Gülcü, 2015; Köse, 2017; Küçük, 2015; Kurnaz, 2010
Vocabulary Learning 10 Studies	Duman, 2013; Ağca, 2012; Aygül, 2019; Gülcü, 2015; Ersoy Özer, 2017; Gümüş, 2017; Köse, 2017; Körlü, 2017; Doğan, 2016; Zengin Ünal, 2015
Simple and Practical 8 Studies	Aksoy, 2012; Ekici, 2018; İlçi, 2014; Ozan, 2013; Özdamar Keskin, 2011; Kalınkara, 2017; Dündar, 2015; Büyükbeşe, 2019
Fun 7 Studies	Tutal, 2016; Aksoy, 2012; Öztürk, 2019; İlçi, 2014; Özer, 2017; Bolatlı, 2018; Büyükbeşe, 2019
Helping a Better Learning 5 Studies	Tutal, 2016; Ersoy Özer, 2017; Gümüş, 2017; Küçük, 2015; Güven, 2019
Flexibility 4 Studies	Öztürk, 2019; Aksoy, 2012; Küçük, 2015; Dündar,2015
Improving Interaction and Collaborative Learning 4 Studies	Tutal, 2016; Aksoy, 2012; Alioon; 2016; Yokuş, 2016
Engaging 3 Studies	Aksoy, 2012; Tutal, 2016; Bolatlı, 2018
Interesting 3 Studies	Özdamar Keskin, 2011; Gümüş, 2017; Büyükbeşe, 2019
Portability 2 Studies	Sarı, 2012; Güven, 2019

Uses of Giving Feedback and Information 2 Studies	Güler, 2016; Ağbulut, 2015
Improving Scientific Process Skills 1 Study	Ekici, 2018
Decreasing Concerns about Technology Use 1 Study	Özdemir, 2015
Increasing Awareness towards Mobile Learning 1 Study	Yılmaz, 2011

In conclusion, a considerable amount of graduate studies reveals the benefits of mobile learning which are, in general, a positive effect on academic success and positive attitude towards mobile learning and the course, increasing motivation. In addition, mobile learning was defined by learners as time and place-independent, easy, fun, flexible, engaging, portable and engaging.

4.6. Challenges and Issues

Even though a majority of graduate studies report positive findings, some studies address the challenges of mobile learning. For instance, although there is a majority of studies proving the positive effect of mobile learning on academic achievement, there are also studies that find out mobile learning does not affect the academic achievement (Yıldırım, 2017; Korkmaz, 2019). Mobile learning is widely accepted among learners. However, some studies found that teachers and learners have a lack of skills and knowledge in using mobile learning tools (Tutal, 2016; İlçi, 2014). While some studies found that mobile learning contributes to active vocabulary learning, others proved that it helps receptive vocabulary knowledge rather than active vocabulary knowledge (Okumuş Dağdeler, 2019). Though mobile learning is widely used in language learning and vocabulary learning, it is used less in writing and listening skills (Aygül, 2019; Çakmak, 2014). In contrast to learners' positive opinions about mobile learning, studies also reported technical and infrastructural problems of mobile learning (Tanrıverdi, 2011; Aksoy, 2012; İlçi, 2014; Khurmyet, 2016; Tutal, 2016). Lastly, the lack of software and hardware about mobile learning was found to be one of the prominent challenges (Efe, 2014; Tutal, 2016)

5. CONCLUSION AND SUGGESTIONS

With the advent of technology, the internet and mobile devices has come a change of direction in learning, and mobile learning has gained importance day by day. An increasing number of "digital native" learners prefer mobile learning since mobile learning is time and place independent, interactive, creative, fun and engaging. Thanks to the prevalent and proven potentials of mobile learning on education and learning, studies on this topic have increased considerably. This study aimed to review the graduate studies on mobile learning in Turkey between 2010 and 2019 to see trends, potentials and challenges of mobile learning. In line with the aim of this study, 92 graduate theses published in the Turkish Higher Education Council (YOK) Thesis Database were analyzed using the content analysis method. The results of the study showed that there was a considerable increase in the number of graduate studies on mobile learning over the years. It was also found that most of the studies were conducted on the field of educational sciences and the samples of these studies were mostly undergraduate students. As for the methodology of these studies, mostly quantitative and mixed methods were preferred rather than qualitative studies.

Of all the potentials of mobile learning, the positive effect on academic success and positive attitude towards mobile learning were the most reported potentials. Learners also stated positive opinions about mobile learning. Taken these potentials into consideration, mobile learning can be offered to digital natives of today and it can be one of the primary modes of delivery rather than an extension to lessons. In addition, mobile learning increased motivation and interest in the course and helped the learners in vocabulary learning and vocabulary recall. Thus, teachers can make use of mobile learning tools to increase their students' motivation. Considering its potential for language learning, mobile learning can be actively used by teachers for in-class and out-of-class activities. However, some studies showed that skills other than vocabulary learning such as writing and listening are largely ignored in mobile language learning applications. Hence, more studies should be carried out on different samples.

In line with the other studies in the literature, mobile learning is reported to be time and place independent, easy to use, fun, flexible, portable and interesting. Moreover, it has been stated that mobile learning provides a better learning opportunity and increases interaction and collaborative learning. Finally, considering all these potentials and the development of mobile learning between 2010 and 2019, it may be effective to use mobile learning in different fields and contexts. However, it should be noted that there are some challenges reported such as

technical and infrastructural problems and lack of software and hardware on mobile learning tools.

Türkiye'de Mobil Öğrenme: Eğilimler, Potansiyeller ve Engeller

Özet

Öğrenmenin öğrenenler, öğretmenler, okul, öğrenme metodolojileri, içerik ve değerlendirme gibi birçok bileşeni, teknolojik gelişmelerden etkilenmiştir. Teknoloji temelli ortaya çıkan öğrenme biçimleri gibi mobil öğrenme de yeni teknolojilerin ve eğitimin iç içe geçtiği bir dönemin ürünüdür. Yeni öğrenmenin ve teknolojilerin giderek kişiselleşmesi, öğrenen ve kullanıcı merkezli bir hal alması, ağlarla bağlantı içinde ve taşınabilir olması ve her zaman her yerde öğrenme mantığı ile önem kazandığı bu dönemde, iş birliği, iletişim, eleştirel düşünme ve yaratıcılık gibi beceriler ön plana çıkmaya başlamıştır. Mobil öğrenme; kişisel olması, öğrenen merkezli olması, taşınabilir olması, işbirlikçi, etkileşimli ve yaratıcı olması ile bu becerilere ve bugünün dijital yerli öğrenenlerine hitap etme potansiyeli vardır. Mobil öğrenmenin bu potansiyeli de bu çalışmanın çıkış noktasını oluşturmuştur. Bu çalışmanın amacı, mobil öğrenmenin yıllar içindeki eğilimlerini görmek ve eğitim alanındaki potansiyel faydalarını ve zorluklarını tartışmaktır. Bu amaç doğrultusunda, Yükseköğretim Kurulu (YÖK) Ulusal Tez Merkezi'nde 2010-2019 yılları arasında yayımlanmış olan lisansüstü tezler gözden geçirilmiş ve verilerin analizinde içerik analizi yöntemi kullanılmıştır. Araştırmanın sonunda, mobil öğrenme ile ilgili yapılmış lisansüstü çalışmalarda mobil öğrenmenin potansiyel faydaları; akademik başarı üzerine olumlu etki, mobil öğrenmeye yönelik pozitif tutum, motivasyonu artırma ve derse yönelik pozitif tutum geliştirme olarak sıralanmıştır. Ayrıca mobil öğrenmenin zaman ve mekândan bağımsız olması, kolay ve eğlenceli olması, kelime öğrenmede yardımcı olması ve etkileşimi artırması da elde edilen bulgular arasındadır. Mobil öğrenmeye yönelik zorlukların ise altyapı sorunları, teknik sorunlar, yazılım, donanım ve içeriğe yönelik eksiklikler olduğu görülmüştür.

Anahtar kelimeler: Mobil öğrenme, Türkiye Yükseköğretim Kurumu, Ulusal tez merkezi, İçerik analizi, Mobil Destekli Dil Öğrenme (MALL), Literatür tarama

About the Author(s)

Gönül ÖZSARI

Gönül Özsarı received her BA in American Culture and Literature and MA in Distance Education. She is currently doing her PhD in Distance Education at Anadolu University, Turkey. She worked as an English teacher in various schools and language courses. She is currently working as an Instructor at the Coordinatorship of Foreign Languages in Konya Food and Agriculture University. Her interests include open and distance learning, mobile assisted language learning, foreign language teaching and literature.

E-mail: gonul.ozsari@gidatarim.edu.tr : Konya Food and Agriculture University, Coordinatorship of Foreign Languages, Konya, TURKEY.

Abdullah SAYKILI

Abdullah Saykili received his BA in English Language Teaching and MA in Distance Education. He's currently pursuing his PhD in Distance Education at Anadolu University, Turkey. He worked as an English language instructor in secondary and tertiary levels for thirteen years. He is currently a faculty member at the department of Learning Technologies Research and Development at Open Education Faculty, Anadolu University. His research interests include open and distance learning, multiculturality, culture in online environments, social media and learning, and foreign language learning and teaching.

E-mail: asaykili@anadolu.edu.tr: Anadolu University, College of Open Education, Eskişehir, TURKEY

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