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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, ASOS Index, ROAD, Rootindexing.

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From the Editors

Dear JETOL readers,

We all witness strange times… After Corona virus outbreak in December 2019, there is a global crisis and the globe is either under lockdown or following social distance protocols. Distance education and online learning appeared to be the new normal. Journal of Educational Technology and Online Learning (JETOL) visions online learning not as an emergency mode, but part of mainstreaming. In such an interesting time, we strive for providing quality articles to contribute to fields of educational technology and online learning.

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, ASOS Index, ROAD, Rootindexing. We hope that JETOL will continue to be a premier source for those who seek and pursuit knowledge.

In the second issue of 2020, we have for articles. The first article, written by Abueng MOLOTSI, The University Staff Experience of Using a Virtual Learning Environment as a Platform for E-Learning, explores university staff experience of using a VLE to study courses online. The second article, written by Suci NURHAYATI, Nunuk SURYANI and SUHARNO, Need Analysis of Audio-Visual Media Development to Teach Digestive System for Elementary School, provides an overview of the current situation of the use of instructional media in science teaching process in elementary school, the perception and challenges faced by primary school teachers in delivering the digestive system subject matter and the formulation of learning media needs to be developed in science teaching on the digestive system materials. The third article, by Aylin CEYLAN, Book Review: Blockchain Technology Applications in Education, presents insights a premier source on blockchain technology. The final article, by Can GÜLDÜREN, Book Review: Utilizing Technology, Knowledge, and Smart Systems in Educational Administration and Leadership, introduces a book which features a wide range of topics such as technology leadership in schools, technology integration in educational administration, and professional development, this book is ideal for school administrators, educational leaders, principals, IT consultants, educational software developers, academicians, researchers, professionals, educational policymakers, educators, and students

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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The university staff experience of using a virtual learning environment as a platform for e-learning

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Research Article

Abstract

Numerous open distance electronic learning (ODeL) institutions have embraced a virtual learning environment as a platform to facilitate e-learning. Although ODeL institutions have embarked on the use of a virtual learning environment (VLE), there is still a need to rethink e-learning processes to make content delivery exciting and interactive. The purpose of this study was to explore the experience of university staff using a VLE to study online courses. The use of VLE enhances content delivery, and university staff must embrace a new interactive learning environment to be on par with peers globally. The connectivism theory was adopted as a guiding framework to explore the staff experiences of a VLE. The use of VLE enhances content delivery and university staff have no choice but to embrace a new interactive learning environment to be on par with peers globally. As this study was empirical, a qualitative approach was used to sample seven staff members who studied e-courses using a VLE. This study was conducted at the University of South Africa (UNISA) which was a natural setting. The participants accessed the VLE within UNISA in their offices to share information with classmates globally. Data were gathered through an open-ended questionnaire. The thematical analysis was applied for analysis. Trustworthiness in this study was credibly maintained through member checking of each participant to confirm whether the information tallied with what transpired during the collection of data. The main research question that guided the gathering of data was: *What are the university staff members' perceptions of the use of a VLE*? The findings revealed that VLE was an enabler of content delivery as it is not bound to a specific time and place but can be accessed anytime and anywhere. It may be concluded that the use of VLE helped to develop the participants' digital skills and motivated them to design online learning courses. It is recommended that university staff be empowered to use other VLE interactive tools, to promote participation and engagement among the students, because VLE is not bound to a specific time frame or location.

Keywords: Virtual learning environment, staff members' experiences, open distance e-learning, collaborate, courses.

1. INTRODUCTION

There is an increasing interest in the quality of content delivery and improved pedagogy in higher education institutions. The VLE has emerged as a successful, viable learning-management platform for teaching and learning in the 21st century. Ferriman (2019) defined VLE as a flexible, effective, and inspiring way to deliver learning content that best suits the needs of students. VLEs have also introduced an 'anytime and anywhere' alternative to learning and delivery of content (Saykili, 2019; Shahabadi & Uplane, 2014), provided that the students have the Internet accessibility (Saykili, 2019). Also, VLEs play an essential role by providing users with learning flexibility and unprecedented opportunities to co-create information. Such a platform allows students to study at their own pace (Gunawan, Kalensun & Fajar, 2018), automatically tracking their progress as they collaborate (Barco, 2018). It offers many advantages for people who are willing to further their studies but are constrained by time (Wayne, n.d.) or geographical location. The purpose of this study was to explore the experiences of university staff when using a VLE to study courses online.

VLEs contribute to enrolment numbers in ODeL institutions. These ODeL institutions play an important role in accommodating diversified students, irrespective of geographical or time restrictions, to further their studies. However, limited contact between lecturers and students is the norm for distance education learning (Owusu-Ansah, Rodrigues, & Van der Walt, 2019). According to Alves, Miranda and Morais (2017), various higher education institutions have adopted VLE to promote and improve teaching and learning. In adopting VLE, the institutions are increasingly searching for a better means of delivering education for their students. The UNISA where the study was conducted is also keen to provide students with better distance education. UNISA is the largest open distance learning institution in Africa and the longest standing dedicated distance education university in the world. The university nearly enrols one-third of all South African students. UNISA was established in Cape Town in 1873 as the University of the Cape of Good Hope and changed its name to the University of South Africa in 1916 (McKay, & Makhanya, 2008). Saykili (2019) attested that the emerging digital technologies in this industrial age forces higher education institutions to adopt a new educational paradigm. He further attested that these innovations enable students to access external learning (outside the boundaries of traditional learning institutions) through informal and enriched learning experience using online communities on new platforms (Saykili, 2019). Ng (2020), expressed a different perspective, she argued that the use of online environments,

which replaces face to face encounters, will come naturally as higher institutions are gradually adopting this profound educational transformation.

UNISA, as an open distance learning institution (ODL), is concerned about education and is determined to achieve its 2016-2030 ODeL strategy. In ODL, learning is presented in online and offline or traditional via mail mode. Whereas in ODeL learning is offered online only allowing asynchronous learning method. Participants in this study were encouraged to change the delivery of modules online and offline to online using VLE. UNISA took the initiative to improve e-learning by agreeing with the University of Maryland University College (UMUC). This agreement enabled fifteen staff members to enrol for a UMUC Certificate in Technology and Distance Education and E-Learning, which took place within a VLE. UNISA staff members were encouraged to participate in studying for the afore-mentioned certificate as it involved a substantial financial investment from UNISA towards their professional development. The agreement between UNISA and its staff members was that, if a staff member did not pass a programme, they would need to repay the enrolment fee to the university. The contracted enrolments took place from 2013 to 2019. This study focuses on enrolment from 2014 to 2017 because the researcher registered in 2017 and received the certificate in 2020. From the fifteen staff members who were registered in this programme, eight deregistered and did not complete the programme.

The withdrawal of these staff members posed the problem in this study and encouraged the researcher to investigate the staff members' experience of using VLE as a platform for e-learning. Furthermore, as one of the lecturers who obtained the certificate, my concern was why other colleagues would withdraw or deregister their enrolments. The other problem was that the researcher did not come across the studies that explored user experiences on the use of VLE in ODeL. Research shows that previous studies primarily focused on the barriers encountered with the implementation of VLEs relating to the capacity of computers laboratory and the Internet connectivity (Herrera, 2017). Demian and Morrice (2012) found that the use of a VLE has little effect on students' academic performance. Bayburtsyan (2016) found that VLEs have a positive impact on students' communication, collaboration, and participation in the classroom.

The UMUC initiative was an attempt to equip lecturers and other interested staff members with e-learning content knowledge and skill that would improve VLE participation. The concern identified previously by other researchers about e-learning usage at UNISA, was that the VLE

was not being fully utilised for teaching and learning (Bagarukayo & Kalema, 2015). Their study further showed that it remained unclear why e-learning is not taken seriously. Accordingly, UNISA is taking the initiative to develop staff members' VLE skills so that they, in turn, can increase active and improved participation in students' e-learning.

This study explored the experiences of UNISA staff members who used a VLE to study courses through UMUC. Staff members were eager to take part in the online programme at its start. However, as time progressed, eight staff members withdrew from the programme, as mentioned before, if they could not pass, they were expected to reimburse the university for the costs. This considerable interest followed by the significant number of staff who withdraw from the programme prompted me to undertake this research. Given the need for improved e-learning skills among faculty members, it is indisputable that the university staff experience of using VLE had to be explored so that improvements could be recommended. The main research question that guided this study was: What are the university staff members' perceptions of the use of a VLE?

In the current research, I explored the participants' experiences of using a VLE in the ODeL environment to study courses online. This study was conducted to contribute to the body of knowledge about VLE in ODeL because VLE embraces active learning and may promotes good throughput rates in institutions of higher learning.

The introduction and problem statement above present the background for the argument in this paper. Hereafter, consideration will be given to the literature review, which presents various authors' opinions about the use of VLE; the research methodology and theoretical framework used to answer the research question; and the findings and discussions that reveal the staff perceptions evidenced by previous researchers' opinions to cement the empirical findings.

2. LITERATURE

2.1. A Virtual Learning Environment

A VLE is a digital classroom where e-learning courses are presented and students learn through interacting, communicating, viewing and discussing presentations, and by engaging with learning resources (Barco, 2018; Bateman, 2012). Rouse (2011) argued that a VLE is similar to the traditional classroom of an institution. The difference between the two is the method of imparting the content to students (Rouse, 2011). In a traditional classroom, a teacher could use

a chalkboard, whereas an instructor in a VLE could use a variety of flexible digital devices that make learning interesting and dynamic. The approaches differ in terms of social interaction patterns (Gunawan et al., 2018).

The principal components of a VLE package include assessments, student tracking, collaboration and communication tools, curriculum mapping, electronic communication, and internet links to external curriculum resources (Awan, 2013; Oxford University Press, 2016). Communication among the VLE users can occur in various forms, such as text chats, live video or audio transmissions, and more (Wayne, n.d.). The users in particular login, spend time within the VLE, check if there were notifications, work through the curriculum, create and post threads, view and respond to classmates' posts, view assignment instructions, ask instructors questions, access the e-server site, email the instructor or classmates, and access students' support sites.

Activities in a VLE are not only about accessing course information, but also about using different technological resources (such as discussion forums, video, and RSS feeds) and then creating web-based learning artefacts, which can be used as an alternative form of assessment (Awan, 2013). The features and potentialities of VLEs provide the opportunity to assess, promote, and support new teaching and learning processes that are well-planned and directed (Alves et al., 2017). Accessing a VLE is not merely about reading shared information (Ng, 2020). Rather, it is to create knowledge through continuous interaction and collaboration (Saykili, 2019).

According to Alves et al. (2017), user interaction and collaboration enables the creation and processing of large amounts of data. The higher the number of university staff that post and share threaded discussions, the more data can be accumulated. Hence, members can peruse their shared thoughts as often as they wish until they became fully conversant with the shared information. Furthermore, the interaction and collaboration boosts learning and stimulates innovative experiences envisaged by the use of VLEs (Alves et al., 2017). Kristóf and Tóth (2019) mentioned that users benefit from participating in a VLE by:

- access to coursework from anywhere, at any time;
- effective time management;
- expanded world view;
- asynchronous discussions with classmates;

- immediate feedback on tests and
- sharpened digital skills.

Boulton, Carmel, Hywel and Williams (2018), in their study concerning engagement and learning outcomes in a VLE, found that VLE activity is associated with high grades, but the low activity does not necessarily imply low grades. Their study also revealed that VLE usage can help to develop digital skills for all disciplines. Another study conducted by Harding (2018) about staff perception of the VLE and online tools, revealed lack of time as a considerable barrier to staff usage of the VLE and that staff usage is primarily for distribution of resources, communication and assignment submission. As mentioned earlier in this study that VLE is a new technology (Barco, 2018; Bateman, 2012), hence, extensive research has yet to been conducted on the university staff perception on the use of VLE.

2.2 The use of VLE in ODeL

Koskela, Kiltti, Vilpola and Tervonen (2005) examined the suitability of a VLE for higher education by comparing learning with a VLE and learning in a traditional lecture. The findings revealed that the VLE students outperformed the lecture students. Mogus, Djurdjevic and Šuvak (2012) reported about data obtained by students' while logging into the virtual learning environment to detect frequencies and priorities of students' choice of activities in a virtual learning environment, the finding revealed positive correlations between students' logs of particular activities and their final mark. It may be argued from this study that VLE in ODeL should be used because of its positive outcomes and changes it brings in the students.

3. CONNECTIVISM THEORY

The connectivism theory best suits this research as it provides a useful framework for understanding staff experiences of a VLE. Connectivism is a 21st century learning theory that explains how Internet technologies have created new opportunities for people to learn and share information across the World Wide Web and among themselves (Siemens & Downes, 2015). Connectivism views interactive learning as the sharing of information within a networked environment, which functions as a community of practice (Siemens, 2005). The participants in this study shared information that they continually acquired within an interactive networked learning environment and they benefited by building collective intelligence. The shared

information can be stored in a variety of digital formats (Siemens, 2005), and users can visit the platform anytime if they so wish.

Connectivism theorist, Siemens (2005), argued that the community of practice creates, preserves, and uses information flow, which is a key to collaborative learning. The university staff in this research were the community of practice. This research explored their experiences as they shared information and skills; they had acquired collectively using a VLE. The notion of connectivism in this research focused on how the participants created information and facilitated interaction using the diversity of opinions as information sources. Saykili (2019) emphasised that information distribution across the network of connected digital technologies rests on whether such connections are possible. In the context of this research, there was no doubt that the connections were possible because the participants were already a connected networked community of practice as they studied to attain the Certificate in Technology in Distance Learning and E-Learning using a VLE.

4. METHODOLOGY

My choice of the paradigmatic stance that informed the research methodology was interpretivist. In the context of the present research, the interpretivist paradigm was used to find out how knowledge is acquired and communicated to other human beings (Kivunja & Kuyini, 2017). The acquisition and communication of data were done through a qualitative case study research approach. Stake (2005) points out that in a qualitative case study, the researcher gathers data on the nature of the case, particularly its activities and functions, through which the case is recognized, and the informants through whom the case can be known. In this study, the case was the UNISA staff members who used the VLE platform for e-learning. The natural setting where this knowledge was acquired, shared and deliberated was at UNISA. An open-ended questionnaire was a data source used in this study. The thematic analysis was used to analyse data.

The population in the study were seventeen UNISA staff members comprised of lecturers and educational consultants who studied the Certificate in Technology in Distance Learning and E-Learning using a VLE. Finding the participants was a cumbersome exercise as many staff members gave flimsy reasons for non-participation. I used convenient and purposeful sampling strategies to select the participants. The participants were purposive sampled based on their

attainment of the certificate. In a convenient sampling technique, participants were selected based on their convenience, interest and availability (Creswell, 2003). Hence, the sample contained a mixture of education consultants and lecturers. The case in this study was the participants who were willing to take part in the study. Payne and Payne (2004) argued that purposeful sampling allows the researcher to select people or events because they are knowledgeable, relevant and suitable for the research. The participants participated in learning online courses using a VLE from the year 2014 to 2017. The participants in this study were seven UNISA staff members, four from the Department of Directorate Curriculum Development and Transformation and three lecturers from the College of Education. Figure 1 outlines the biographical details of the seven participants. All the participants were UNISA staff members consisted of five women and two men. Six of the participants' age range between 50 and 64 years; one participant was between 30 and 49 years. Four participants were educational consultants and three were lecturers.

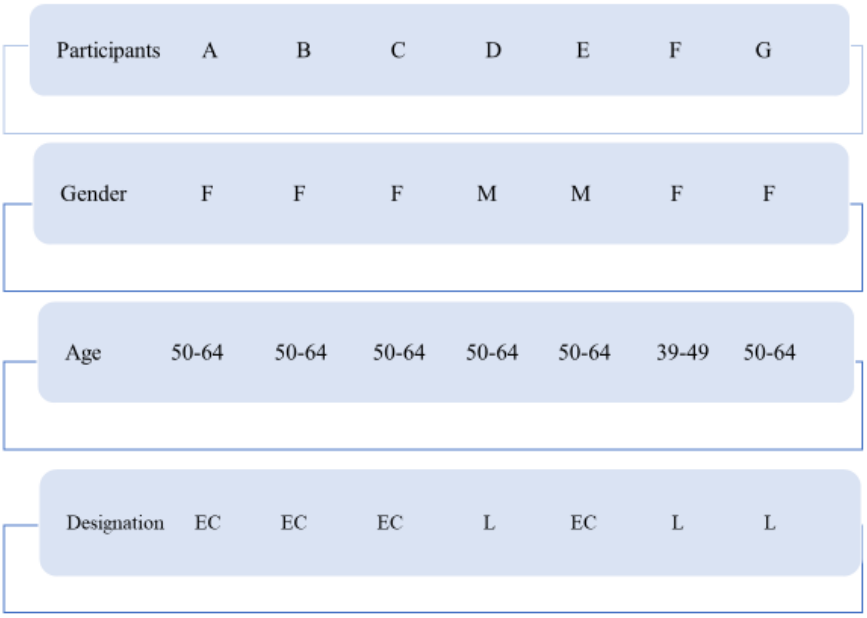

Figure 1. Biographical information of participants

The UNISA College of Education ethics committee granted permission for the study to be conducted. Anonymity, confidentiality, and voluntary participation in the research were also observed. I substituted participants' names with alphabets from A to G and labelled all data accordingly to assure anonymity and confidentiality. I also guaranteed the participants that their shared experiences would remain confidential and that their names would not appear in any

publication resulting from this research. The participants were informed that they were not forced to participate and had the right to withdraw from the research at any stage without any penalty. There was no emphasis on gender distribution, as it had no impact on the study.

Data Collecting Tools

An unstructured interview and open-ended questionnaire was used as an instrument to collect data. The instrument consisted of twelve items that the participants were asked to respond to within one month. The items in the instrument were informed by the purpose of the research and theoretical framework and were asked in such a way as to find out how participants created information and interacted in a VLE platform. To maintain credibility, the instrument was sent to a research expert who confirmed its trustworthiness. Trustworthiness in this research was also established through member checking to validate the credibility of the findings. After the data were transcribed, I contacted each participant to confirm whether the information tallied with what transpired during the collection of data. It was challenging to collect data as the participants always had tight schedules and were not readily available. A combination of open-ended questions requiring written answers and telephonic follow-up on questions that needed further explanation assisted in this regard. An audio recorder was used to capture telephonic data with permission from the participants.

Data Analysis

I analysed data continuously while receiving responses from the participants. The main question that guided data gathering was: What are the university staff members' perceptions of the use of a VLE? Twelve questions were initially posed in the instruments. Data were captured and analysed manually. During the analysis, I created a table, checked data, then captured and cleaned it concurrently. The participants' responses were captured in the order of the questions posed. Data were captured simultaneously while detecting and repairing errors within the collected data. Irrelevant and duplicate responses were not included in the analysis process as they could have delayed the data analysis process. From the twelve questions asked, it is worth indicating that four questions' responses were not included in this data analysis because they were not relevant to the research questions posed for this paper. This implies that only eight questions' responses were used and were relevant to provide answers to the research questions. The thematic analysis procedure was employed in analysing data (Creswell, 2007). I read through the collected data from the open-ended questions and created codes. Noticeable

relationships led to the emergence of eight themes. The themes included VLE participation, technological knowledge, balanced life, VLE opportunities, VLE challenges, digital skill, quitting e-learning and VLE Intention to deliver content. The findings and discussion are presented based on the themes.

5. FINDINGS AND DISCUSSIONS

The findings and the discussions are presented based on the themes that emerged from the eight questions.

Theme 1: VLE participation

In Question 1, participants were asked: *What was your preferred place and time to access or participate in the VLE?* The theme of VLE participation was generated to gain an in-depth understanding of this question. The finding showed that the participant participated and accessed the VLE anytime and anywhere. It was noted that of the seven participants, five indicated that they accessed and participated in the morning, one in the evening, one anytime. In this regard, participant F uttered *I access and participate in the VLE from my office in the morning and late in the evening when the internet traffic is not so heavy*. Participant C said *any time when I was free from my workload*. These findings showed that the participants had different views of the preferred place and time to access or participate in VLE. I may argue in this study that the VLE enable the participants to access and participate 24/7. The use of VLE provided the participants with the opportunity to access and responded to threaded chats in their own time and a place convenient to them. This concurs with the views of Shahabadi and Uplane (2014) and Saykili (2019) who stated that students are provided with alternative 'anytime and anywhere' participation in e-learning. Saykili further attested that these innovations could enable students to learn outside the boundaries of a traditional classroom through informal and enriched learning experience using online communities on new platforms.

Theme 2: Technological knowledge

In Question 2, participants were asked: *Do you think pre-enrolment training on the use of VLE could have assisted you and why?* The theme of technological knowledge was created. The findings revealed that the pre-enrolment training on using a VLE was found to be unnecessary for the participants. The findings showed that five participants could manage without prior training; only two showed the need for training on the use of technology. In this case,

Participant's A indicated that "*No, since I am required to work with technology, I did not feel it much of a challenge except that I needed to investigate a lot more technology use than I am used to working with.* It was also evident in this study that some of the participants' had technological knowledge because they indicated that they could navigate the VLE without prior training. This suggested that their technological knowledge played an essential role in browsing and navigating the VLE. Annansingh (2019) advocates technological proficiency as a key to participation in a VLE.

Theme 3: Balanced life

In Question 3, participants were asked: *As a working adult, how did you balance your work-related issues, family matters and learning using VLE?* The theme of a balanced life was generated. The findings revealed that most of the participants indicated that it was difficult to lead a balanced life. However, they had no choice but were expected to submit assignments weekly without fail. Participants G indicated that *it was not easy to find the right balance between learning courses online using VLE and taking care of the family*. The findings also revealed that the continued sharing of knowledge and information within VLE compromised their family lives. Participant C mentioned that: *My home life suffered a lot. I had little time with my family*. It may be argued in this study that balancing life was not easy for the participants and they had family responsibility as well as to attend to their work while attending to VLE participation. One may argue that the issue of balancing life is related to time in terms of allocation to the various task as an adult. This was observed in Harding (2018) findings that lack of time was a considerable barrier to staff usage of the VLE.

Theme 4: VLE opportunities

In Question 4, participants were asked: *What VLE opportunities did you embrace and share with UNISA colleagues?* The theme of VLE opportunities was generated. The findings revealed that all the participants unanimously felt that they experienced the opportunity to use both asynchronous and synchronous digital tools to discuss and interact. In this regard, three participants identified blog, one a discussion forum, two participated in social media tools discussion and one in synchronous and asynchronous digital devices. Participants B said: *I had a few opportunities to participate in synchronous class discussions and to attend virtual conferences*. It was also found in this study that participants had an opportunity to learn to use

other technology tools to enhance their teaching and learning. In this case, Participant F indicated the use of *ePortfolios, social media, and other educational technology tools to learn and teach*. The argument in this theme is participation and collaboration within the VLE provided the participants with hands-on experience of technology that helped them develop their digital skills. Similar sentiments were found in Boulton et al., (2018) who revealed that VLE usage help to develop users' digital skills. Alves et al. (2017) attested that interaction and collaboration boost learning and stimulates innovative experiences for users.

Theme 5: VLE challenges

In Question 5, participants were asked: *What challenges did you encounter during discussion, and interaction in the VLE?* The theme of VLE challenges was created. The findings revealed that the participants did not encounter any challenges with the use of VLE when engaging in discussion and interaction. It was critical during the programme that they participate and interact as this was one of the criteria for evaluation. One may argue that the participants experience a better way of learning electronically which did not take place in real-time. Here, Participant A's views was that: *Not really, we did not have problems we had opportunities to clarify our points and besides, we knew we were going to be marked for our discussions and therefore generally kept the discussions as professional as possible*. The findings in this study differ with other studied in VLE where challenges are mostly experienced such as slow access to the Internet, lack of infrastructure etc. (Herrera, 2017). I can argue in this study that the reason for not experiences challenges was because all the participants had adequate technologies in their offices and at home to use.

Theme 6: Digital skill

In Question 6, participants were asked: *Did the use of VLE sharpened your digital skill? Please explain what you have acquired using VLE*. The theme of digital skill was created. The findings revealed that most of the participants felt that their digital skills improved. This was evident when they indicated that the acquisition of digital technology was an enabler to deliver content online. This evident when participant F said: *VLE definitely sharpened my digital skills in teaching and learning online. It also sensitised me to opportunities that are available in using various online digital resources*. It was also found that participants gained confidence and realise the possibility to design and deliver modules online. Some of them were motivated to

design online learning courses for their students. In this case, participant G mentioned that: *I have acquired skills in designing an online course for my students*. The use of VLE was a revelation for the participants to realise the possibility of offering modules using digital technologies. Another skill that was identified by the participants was the use of collaboration tools. In this case, participants were able to use both asynchronous and synchronous methods of discussion. The VLE participation was found to be in line with the theory of Connectivism that emphasis the community of practice which is a key to collaborative learning (Siemens, 2005).

Theme 7: Quitting e-learning

In Question 7, participants were asked: *During the VLE collaboration sessions, how many ties did you consider quitting e-learning, and why?* The theme of *quitting e-learning* was developed. The findings revealed that most of the participants never thought of quitting e-learning except for one. Participant B indicated that: *Giving up was never an option to me*. It is evident in this study that besides participants sharing their thoughts, the platform provided them with high learning flexibility that necessitates learning from each other as a community of practice. This finding is supported in literature where the theory of connectivism emphasises that learning together through an interactive, networked learning environment enhances learning (Siemens, 2005), Furthermore, Saykili (2019) concurred by stating that continuous interactions and collaborations as a group brings a meaningful and better understanding among a community of practice.

Theme 8: VLE intention to deliver content

In Question 8, participants were asked: *Having acquired VLE skills, how do you intend to use this experience in delivering content?* The theme *VLE Intention to deliver content* was developed to gain an in-depth understanding of this question. It was found in this study that participants after training had intentions to use VLE support other academics and staff members to deliver content. The findings revealed that the three participants who are educational consultants highlighted that they used their acquired VLE skills to support colleagues in the institution. In this regard, Participant C declared: *I am using my VLE skills to carry out my job as an instructional designer*. It was also found that four of the participants highlighted that they would offer modules online. Here, Participant E said, *I will be able to teach online modules and*

assist students to learn using a variety of online tools like OERs, active learning, and communication apps. These findings are supported in literature where the theory of connectivism emphasised that internet technologies have created new opportunities for people to learn and share information (Siemens & Downes, 2015). I may argue in this study that the acquired VLE skills enabled the participants to enhance support to their colleagues and were determined to deliver modules asynchronously. In this regard, the participants' intention to use VLE is realised.

I may argue in this study that the withdrawal of ten staff members posed the problem. This led to the investigation only focus on the experience of seven staff members who remained and completed the programme. The aim was to find out their perceptions on the use of a VLE. When looking closely at the theory of connectivism, it encourages staff members to embrace digital technology and the internet because of the opportunity it provides for people to learn, interact and share information through the internet (Siemens & Downes, 2015). In this era, the 21st century, it is required and imperative that digital technology integration in education takes a lead. The staff members should embrace the empowerment programmes on the development of digital technology, this will assist them to support students and academics in online learning. Furthermore, students' needs to be competitive and be able to use digital technology with peers globally. It is clear from the findings that most staff members benefited from the programme. They were exposed to various digital technologies that assisted them to improve their pedagogical practices. Participants in this study acquired skills of interactive synchronous and asynchronous. As adult learners who have other commitments, they learnt to balance their lives while becoming life-long learners. Being trained in VLE, given the opportunities to design and deliver their content online. It was noted that from the seven participants who completed the course, none of them thought of quitting.

6. LIMITATION OF THE STUDY

Using the qualitative method led to the concise mapping of the most relevant information about the participants' perception of using VLE. The results showed that the use of a VLE developed the participants' digital skills. The acquired digital skills motivated the participants to design and deliver fully online modules. This finding can be embraced by the institution to help motivate more staff to facilitate their modules in a fully online method.

Despite proper planning of conducting research, it is not always without its challenges. The first challenge was the limited number seven of the participant who participated in this study. Most lecturers and educational consultants refused to participate in the study and gave various reasons for non-participation. Although the plan was to collect data in less than a month, the collection period was extended to one month, which was advantageous as collected data had in-depth and rich contextual responses.

The qualitative case study research approach suits this study, as the intention was not to generalise the findings. On the contrary, this research contributes to new knowledge about modern, innovative digital technologies that readers may need to embrace as innovative ways to facilitate learning. More participants would have been beneficial to provide wider coverage and understanding of the university staff perception of using VLE.

7. CONCLUSION AND SUGGESTIONS

In conclusion, this study set out to explore the experience of university staff when using a VLE as a platform for e-learning to study courses online. The findings revealed that VLE is an enabler to content delivery and it is not bound to a specific time frame or location. The participants accessed the platform anytime and anywhere. Previous research concurred with the current findings by highlighting that new technologies enable users to learn informally and experience enriched learning using new platforms to build online communities of practice. Enriching learning in this digital era is no longer entirely under the control of an individual but as Ng (2020) states, the contribution of all users builds both individual and collective intelligence. The use of a VLE helped develop the participants' digital skills. These digital skills they acquired motivated them to design and offer fully online modules for their students. It is recommended that university staff be empowered to use other VLE interactive tools, to promote participation and engagement among the students. Again, it is recommended that further research be conducted on how university staff should interact and facilitate online learning using a VLE. A further study may be conducted using a mixed method with a larger sample. Bagarukayo and Kalema's (2015) findings of e-learning, in collaboration with the findings of this study, envisages further study on how e-learning can be promoted and facilitated in the institution.

Üniversite personelinin e-öğrenme platformu olarak sanal öğrenme ortamını kullanma deneyimleri

Özet

Açık ve uzaktan öğrenme (AUÖ) yoluyla öğretim yapan pek çok kurum e-öğrenme süreçlerini kolaylaştırmak için sanal öğrenme ortamlarını benimsemiştir. Bu kurumlar, sanal öğrenme ortamlarını kullanmaya başlasa da içeriklerini etkili, verimli ve etkileşimli hale getirmek için kurumların e-öğrenme süreçlerini gözden geçirmeleri gerekmektedir. Bu bağlamada, bu çalışmanın amacı sanal bir öğrenme ortamı kullanan ve çevrimiçi ortamda ders veren öğretim elemanlarının deneyimlerini araştırmaktır. Sanal öğrenme ortamı kullanımı ders içeriklerinin dağıtımını geliştirmektedir bundan dolayı öğretim elemanlarının dünya genelindeki meslektaşlarıyla aynı düzeyde olmaları için bunun gibi etkileşimli öğrenme ortamlarını benimsemeleri elzemdir. Güney Afrika Üniversitesi'nde (UNISA) yürütülen bu çalışmaya 7 öğretim elemanı katılmıştır. Çalışmanın temel araştırma sorusu şudur: Öğretim elemanlarının sanal öğrenme ortamının kullanımına ilişkin algıları nelerdir? Nitel araştırma modeli ile desenlenen çalışmada kuramsal çerçeve olarak bağlantıcılık kuramı benimsenmiştir. Veriler açık uçlu bir anket aracılığıyla toplanmıştır. Verilerin analizinde, tematik analiz uygulanmıştır. Bu çalışmada güvenilirlik, verilerin toplanması sırasında katılımcılar tarafından aktarılan bilgilerin doğru olup olmadığını onaylamak için her katılımcıya teyit ettirilmesiyle sağlanmıştır. Bulgular, sanal öğrenme ortamlarının belirli bir zaman ve yere bağlı olmadığı, ancak her zaman ve her yerden erişilebildiği için içerik sağlamayı mümkün kıldığını ortaya koymaktadır. Ayrıca, sanal öğrenme ortamı kullanımının katılımcıların dijital becerilerini geliştirmeye yardımcı olduğu ve onları çevrimiçi öğrenme dersleri tasarlamaya motive ettiği sonucuna varılabilir. Son olarak, öğretim elemanlarının öğrenenlerin derse katılımını teşvik etmek ve derse bağlılıklarını artırmak için sanal öğrenme ortamının etkileşim araçlarını kullanmaları tavsiye edilebilir.

Anahtar kelimeler: Sanal öğrenme ortamı, öğretim elemanı deneyimleri, açık ve uzaktan öğrenme, e-öğrenme, iş birliği.

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Need Analysis of Audio-Visual Media Development to Teach Science Materials for Young Learners

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Research Article

Abstract

This qualitative study aims to obtain an overview of the current situation of instructional media use, and learning media needs formulation in science teaching process in junior high school by understanding their accessibility potential by knowledge, types of media used, and to state their perceptions to adopt media in science teaching on the static electricity and digestive system materials. The participants are 20 teachers and students in three junior high schools around Surakarta. The data were collected through two parts of electronic questionnaire during the odd semester of 2019/2020 academic year. The results indicated that 1) the current instructional media use in the science learning process has not been carried out optimally since they have the convenience of choosing and using variations of media. 2) There are challenges in the material delivery of abstract, conceptual, and procedural materials since the teacher needs a media to visualize the process and explain it correctly in and so that students have detail conceptions about the process. 3) There is a need for learning media to be developed in science learning, especially in form of audiovisual media. This result can be a consideration in developing science learning media for junior high school.

Keywords: need analysis, media, audiovisual, static electricity, digestive system

1. INTRODUCTION

The learning process will be useful if students' understanding of the concepts is achieved. In learning science, understanding the idea and procedure to students determines the learning success since the process of understanding the idea makes the primary knowledge foundation of further learning. Understanding the science concept and procedure is one of the crucial goals to learn science. It provides comprehensive theory and procedure taught to students are not merely rote but must be clearly understood. Understanding the concept of biology and physics is also one of the learning objectives conveyed by the teacher because the teacher acts as a guide for students during learning to achieve the expected idea (Yahya, Hermansyah, & Fitriyanto, 2019).

Science is a human effort in understanding the universe through proper observations of targets, using structured procedures, and explained with scientific reasoning to get a conclusion. The Indonesian 2013 curriculum stated that junior high school students are expected to master several essential science competencies, such as static electricity and digestive process. The core of learning static electricity material is applying the concept of electrical circuits, energy, and electric power, sources of electrical energy in daily life, including alternative sources of electrical energy, as well as various efforts to save electricity (Hasbi, Kosim, & Gunawan, 2015). Thus, materials of digestive system and processes contain an amount of abstract and conceptual (Susantini, Nuur, & Thamrin, 2013), and extensive and complex material. It includes a number of processes that occurred in inner organs with many foreign terms, so it is difficult to make direct observations and has a high level of complexity understanding. Based on the scope of those subjects, the teacher is required to convey the conceptual concretely so that students can easily understand, and there is no misconception of concepts.

Science is not only a collection of knowledge about objects or living things, but it is a knowledge that requires work, ways of thinking, and ways to solve problems. Learning science can be conveyed by bringing everyday problems experienced by students in the classroom. Through learning process, hopefully, students can develop scientific attitudes (Indrawan, Jampel, & Mahadewi, 2019). The issues learned during the learning process must be able to make students understand the concepts of science and pursue students to discover facts and new knowledge out of class as application of scientific methods and experience in everyday life. Understanding student concepts will greatly influence learning success. The idea of the humans' static electricity and digestive system is closely related to everyday life, so students must understand the concepts. However, based on the results of interviews conducted with science teachers in junior high school in Surakarta, the teacher explains that the learning process is not optimal. The teacher only uses students' books and the teacher's book as the only one learning resource. The teacher also explains that media is very rarely used in the learning process. Teachers are more likely to use the lecturing method and ask students to note. There is no laboratory or practice activity since the lack of facilities and capability. This situation makes students feel bored with science lessons, especially on static electricity and humans' digestive system material and other conceptual matters. Laboratory activities provide a huge role in building an understanding of concepts, verification or proof of a concept, and foster basic skills of scientific work and affective abilities of students (Dhang, Jana, & Mandal, 2017). This

condition is also supposed to build students' lack of understanding and low grades achievements.

The alternative effort that can be used by teachers is by presenting a series of procedures of static electricity and digestive system more concretely by media. The media will overcome the absence of laboratory activities that lead misconceptions by visualizing the concept (Saragih & Utami, 2019). The use of instructional media can improve learning efficiency, facilitate students in understanding concept be more concrete (Liu, He, Tian, Fan, & Yao, 2018) and clarify the presentation of messages and information served by teachers (Dewi & Mukminan, 2016) and improve the process and learning outcomes. The use of instructional media should be a concerning part for the teacher in every teaching and learning process (Dosi & Budingsih, 2019). Therefore, teachers should have an intention and need to learn how to use learning media to effectively achieve learning objectives in the teaching and learning process (Komalasari & Saripudin, 2017), especially conceptual and abstract materials. Many researchers have tested the use of media in science learning to introduce abstract concepts to early childhood learning. Characteristics of young learners who need concrete visualization will be targeted points. Audiovisual media with the features of visual and audio combination will help very well toward the mastery of concept (Hotimah & Muhtadi, 2017). The materials in static electricity and human digestive system are selected since perceived as representative of conceptual and procedural elements among other challenging science learning materials.

Based on the above background, this research needs to be carried out as a preliminary study in the development of learning media on science learning for junior high school. The formulation of the problem in this study are: 1) to what extent the description of the current use of instructional media as a source of teaching in the science learning process? 2) what are the perception and challenges faced by teachers in junior high school on the delivery of the science materials? 3) how is the formulation of learning media needs to be developed in learning science for junior high school?

2. METHODOLOGY

This research is limited to the need analysis survey (need assessment) sourced from initial observations in junior high school. This qualitative research used the phenomenological approach to find out the reality in the field related to the implemented learning process.

Respondents of this study are 20 science teachers from three different schools in Surakarta, Indonesia. The science teachers (and students are also included) are randomly selected to provide information about potential and problem of the science learning process in classroom situations and current use and acceptance of media in the learning process. Each school has different characteristics according to the facilities and conditions of the school.

The data collection technique in this study is in the form of a questionnaire. The questionnaire is used as a needs analysis instrument for teachers and students. The survey was designed with questions related to the use of media and perceptions about audiovisual media, which consisted of 2 parts. The first part consists of three items that collect information about the use of media, teacher's knowledge about media, and the types of media used. This part is partly adapted from the need for technology integration by Zhu (2018). The second part measures students' perceptions of the application of learning media in class, which consists of two questions about the acceptance of use media in class and followed by open-ended questions about the reasons for choosing an agreement statement. This part of the questionnaire is partly adapted and modified from the perception of technology by Hanif et al. (2018). Item reliability of those two questionnaires was estimated as α=0.94.

The survey was conducted from August till October 2019 in the 2019/2020 semester (odd semester) and distributed by email. The completed response sheets were collected, compiled, and statistically analyzed to compute the results using Microsoft Excel. Data from questionnaires filled out by respondents will be analyzed descriptively and qualitatively. The percentage method was used to present the result of data reduction.

3. FINDINGS AND DISCUSSION

Use of science learning media

Based on observations made by researchers at the three schools, it found that the learning process in schools has not been implemented as expected. Educators, especially science teachers, sometimes encounter difficulties in the process of delivering learning material. Even though the students' reactions were quite enthusiastic, there were still some passive students. The teachers encountered problems due to the absence of media for some of the materials science. The materials require visualization of objects to explain a series of physics and biological processes that are not able to be observed directly. The use of pictures in books is

insufficient to support this problem. As a result, students do not master the material concepts well. In static electricity material, the concept of electrical circuits, energy and electric power, sources of electrical energy in daily life, including alternative sources of electrical energy, as well as various efforts to save electricity, are perceived as challenging to be mastered. Thus, some other abstracts and conceptual materials such as photosynthesis, cell division, and metabolism, according to the teachers, need to be visualized. The absence of laboratory equipment made the practice of learning hard to be executed. (Sypsas, Kiourt, Paxinou, Zafeiropoulos, & Kalles, 2019) All teacher respondents stated that the subject matter included difficult material since hard to find the visualization. In the delivery, there are also obstacles, the difficulty of understanding students at each stage of digestive organs because the process occurs in inner human organs. Hence, students have trouble understanding and imagining the process. As a result, student misconceptions can occur on the subject of digestive organs, a series of digestive processes, digestive problems, and nutritious foods. Those problems can be investigated in several paths below.

Knowledge about learning media.

The decision to use media will be influenced by the teacher's ability. Teachers' knowledge in media is a dominant factor in the use of media in classroom. The experience will drive the teacher to use media variation to perform better teaching. Illustration of expertise in learning media by teachers can be illustrated through access to technology tools and the type of media used in the diagram below. The chart shows that 95% of 20 teachers have their own electronic devices or at least have access to electronic computing devices. Access to computer equipment also includes teachers who do not have their personal computer equipment, but they still can use the computer of the school or the facilities of other family members at home. Only 5 % of teachers indicated that they have no access to computer devices.

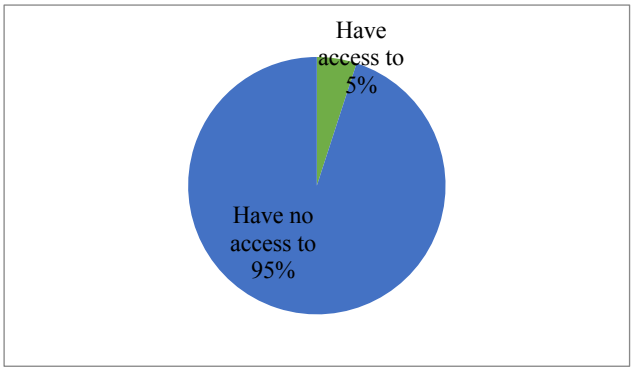

Figure 1. Percentage of access to computer equipment

This depiction indicates that the teacher can be involved in using media if the teachers have intention to apply learning media in the classroom because almost all teachers have sufficient access to computer equipment.

Types of learning media used by teachers.

Furthermore, teachers who have computer devices use various media. Computer devices might help teachers to use digital interactive media. However, from those teachers, very few teachers utilize or create audio-visual media as a learning media. This condition shows that audiovisual media must be considered as the media of choice when designing learning for them because of the potential for adequate audiovisual users in the class. From the results of observations (Figure 2). From these results, it can be concluded that the use of instructional resources in the form of audiovisual media is still less in utilization. It is contradictory to an assumption which physics and biological material requires more visualization of objects and procedure in detailed than verbal explanations. All teacher respondents also stated that abstract and conceptual content needs to be delivered by presenting object visualizations and also showing and explaining scheme processes in detail. Therefore, the use of appropriate teaching resources or media needs more attention.

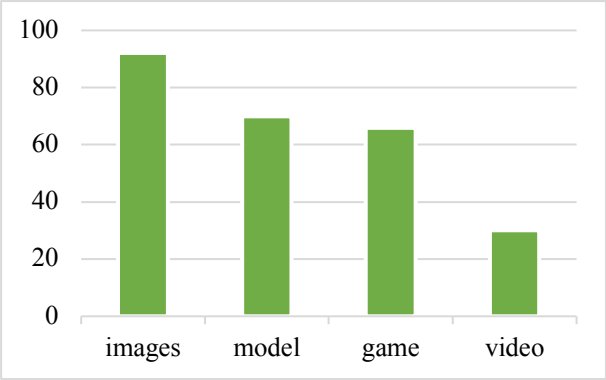

Figure 2. Distribution of types of learning media used

In the diagram above, in general, there are five types of media used by students. Images or pictures are a type of media used to explain shapes in two dimensions. This type of application is also used by 92% of the total teachers. The second type is model. A model such as torso dolls is used to show three-dimensional shapes in silence. This application has the most significant percentage of users, with 70% of total students. It means that many teachers often used this type. Game and entertainment refer to several games and entertainment-type applications for its users. As many as 66% of teachers have used this type in their learning. Media video is a

combination of audiovisual that are combined to reveal and get information. This type is only used as much as 30% of the total number of teachers actively using instructional media. The chart is also indicated less number of interactive media. The teachers prefer to utilize still pictures rather than animated or motion picture as visualization media. While 5% of students exclusively own other types of media outside the 4 types above. The assumptions of these findings indicate the range of learning media used by the teacher. The teacher will have the convenience of choosing and using variations in the types of media in the classroom, which are very varied.

The perception and challenges of the audiovisual media

The second part of the questionnaire was used to collect data on students' perceptions of audiovisual media. Good media can produce success if students do not respond to the media. For this reason, students should be invited to make use of all their senses, and the teacher tries to display stimuli that can be processed with various senses (Hanif, Asrowi, & Sunardi, 2018). The more sensory devices used to receive and process information, the more likely is understandable and can be retained in memory. Audio messages in learning are needed to focus student attention, so a lesson that has audio and visual dimensions will give the message given be stronger since combining the two delivery systems. Audio-Visual Media means audible and visible media, which means it can be heard and seen. Audio visual-based media can help students understand and comprehend the material being studied(Aravind, 2016). The objects and events which become the material teaching can be visualized realistically to resemble the real situation.

Audiovisual media acceptance

The first part of this perception describes the level of student acceptance of the audiovisual learning media system in teaching and learning activities.

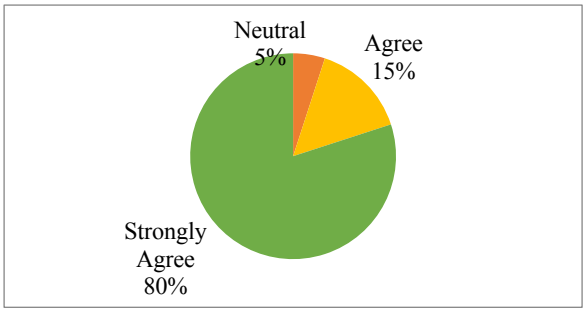

Figure 3. Percentage of student in agreement

For this section, all participants stated their position to choose to agree or disagree and followed by their reasons. The results show that all students prefer to accept (agree) to use audio-visual media in class. The level of student acceptance of audio-visual media is represented by the statement " Strongly agree " and " Agree ", while rejections are represented " Strongly Disagree 'and' Disagree.'. The chart above shows that almost all students have the will to apply audiovisual in science class. There is no intense student who will refuse the use of audiovisual media in classroom learning. Only 5% of all students answered neutrally, while 15% of students agreed, and 80% strongly agreed.

The highest number of students who strongly agreed to use audio-visual media in learning, namely 8%, also proved the active encouragement of students to actively contribute to the learning process when later using audio-visual aids. Subsequent analysis will only focus on the level of acceptance because no student does not agree to apply audiovisual media in their class.

Teaching and learning resources

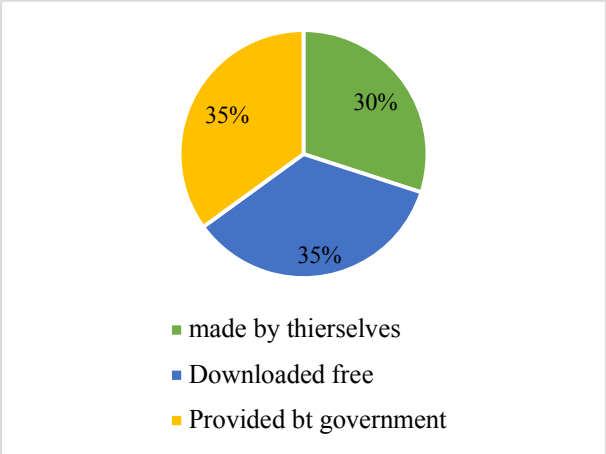

Figure 4. Top 3 teaching and learning resources used

In reality, as many as 70% of teachers did not create their own teaching resources but obtained from the internet or only used books from publishers. The fact that only 30% of the teachers in these three schools make their own material. It explains that there is an intention to develop the learning resource independently. The teacher has tried to make their own media or teaching resources, but in making them face obstacles such as in making it difficult to develop more detail, inadequate facilities, and require more accuracy and patience.

The observations also found that 100% of students are more interested in learning by using a variety of media. Students prefer to learn with media that shows how to work, pictures, or

material in more detail and realistic than learning by only using textbooks, modules, or textbooks. Learning resources obtained from the internet, if not sorted correctly, can cause students' misconceptions of the material being taught. Teaching sources from publishers are also considered to be less varied and cannot be used as a complete source of reference in the delivery of material. The teacher has tried to make their own media or teaching resources, but in making them face obstacles such as in making it difficult to develop more detail, inadequate facilities, and require more accuracy and patience. As a result, the media or teaching resources used by the teacher cannot function optimally by students and still lack understanding of the material being taught.

Discussion

The external factor that can affect the learning outcomes of science learning is the use of instructional media. The use of appropriate learning media in delivering sciences material can make students understand the material delivered by their teacher. Learning media is a tool for students in order to gain a significant learning experience. (Novianto, Degeng, & Wedi, 2018). Affordability rate and high enough access to technology will facilitate subsequent teachers implement audiovisual media in learning. On a smaller scale, schools or class, it is also essential to consider the number of teachers who do not have access to technology. School authorities need to deepen how the number of minorities who do not have access to computer technology will still be able to make the learning process using audio-visual media.

The material of static electricity and human digestive system are some representative of challenging junior high school science material. This material is considered by students and teachers to be quite tricky because it is conceptual and requires a lot of media such as pictures and videos, and other types of interactive media to visualize, so students understand more about the procedure and process. Media or learning resources used so far only use teacher books and student books. The use of this book as the only learning resource is unable to facilitate students, especially when teachers have not used the media to support the learning process. This lack of media use and laboratory activity, according to Masril, Hidayati, & Darvina (2019), arises a problem of students' lack of understanding of the concept. Less interaction and understanding of the concept and eventually cause not optimal learning achievements. Learning science must provide an opportunity to think logically by gathering facts found with their potential to form a

conscientious and critical personality so that the laboratory activity and discovery should provide by teacher during learning.

Based on the explanation above, it can be concluded that learning science must provide an opportunity to think logically to students by gathering facts found with their potential to form a conscientious, critical personality and not easily give up. The material of static electricity and the human digestive system is full of abstract concepts that require media features to describe the concept. The limited laboratory facilities in school cause the inability and capability to provide practice and discovery learning.

The alternative solution to the problem is to develop a learning multimedia product that contains static electricity and digestive system material in humans. This multimedia development is assumed to be able to overcome the issues described above, the use of multimedia learning in delivering content has its own benefits and advantages, from several relevant studies the use of multimedia learning will make science learning more effective, making students more enthusiastic, especially can improve students' understanding of concepts, especially on the digestive system material in humans (Zhu, 2018).

Utilization of multimedia in education, especially in delivering material, is beneficial for students and teachers, as explained by Incedayi that school requires multimedia technology because by using multimedia students can immediately see and hear the things being learned, students can also choose the material they like (Incedayi, 2018). Interactive multimedia empowers the educational process by means of increased interaction between teachers and students. The application of multimedia technology in instructional media development is able to integrate aspects of knowledge and skills (Rajendra & Sudana, 2018). Students' attention will also be more focused on learning, and their curiosity will increase because the multimedia used attracts their attention. Babiker (2015) argues that using multimedia in teaching can benefit students by helping to meet the demands of information related to the material being studied. Multimedia also allows students to interact with information in different media. Kareem (2018) added that multimedia is described as a system for conveying information that combines various types of communication such as text, video, audio, photos, sounds, animations, images and interactive content (Hat, Hamid, Sha'ari, & Zaid, 2017) which is then packaged using a computer.

The teacher also states that the learning resources needed to be developed and can be used as a source of independent learning for students are audiovisual learning media. Audio-visual

material can only be meaningful if it is used as part of the teaching process. By using audio-visual media, students can utilize technology and media in a series of ways to enhance their learning as an alternative source for independent learning (Hapsari, Hanif, Gunarhadi, & Roemintoyo, 2019). But in the schools observed, both the teacher and other developers had never developed audio-visual media before. Therefore, it is necessary to create a media that can demonstrate learning materials (Shi, 2017), especially static electricity and human digestive system, that are abstract or not directly observed.

Another proposed solution to provide meaningful learning capabilities within the limitations of laboratory facilities and infrastructure is to do practicum virtually (Yahya, Hermansyah, & Fitriyanto, 2019; Masril, Hidayati, & Darvina, 2019). This virtual practicum is one alternative model in overcoming the problem of practicum implementation in schools, which sometimes requires a lot of time and expensive costs. Liu et al. (2018) revealed that to modify a complete practicum can be done with a virtual form, especially for abstract physics concepts.

Some cognitive-perceptual development of first-grader of junior high school children develops in aged 11-12 years. Children begin to have a more abstract way of thinking: in this developmental stage. They already have the ability to find solutions in solving a problem without the real object of the problem and are able to remember information that has previously been stored. Children have good enough memory capacity to be able to sort, organize, classify, and classify a problem at hand. (Syawaludin, Gunarhadi, & Rintayati, 2019). This skill is needed to solve a complex problem. The issue can be solved by several solutions, not just one solution. Fostering the students to enjoy the challenges, do research, find information, and solve a problem with the idea that has been previously owned and explore information from the internet and encyclopedias can be a better method to be selected.

From some of the above opinions, it can be concluded that educators must be able to create learning media that is tailored to the development of students. Learning activities are structured to generate active, independent, and systematic thinking skills. Students are in school to learn does not mean students do not have any knowledge, but students already have the experience to help them construct their knowledge at a later stage. Therefore, educators need to combine learning activities with various methods, media, and use appropriate approaches to the stage of their development to be able to provide a deep understanding and develop their thinking skills. An audiovisual learning media in the form of a virtual laboratory, in this case, seems appropriate to bridge the potential issue.

4. CONCLUSION AND SUGGESTIONS

The results of this study are: 1) the use of instructional media as a source of teaching in the learning used science subject so far has not been executed optimally, 2) there are obstacles in the delivery of conceptual material, especially theoretical material which its nature cannot be directly observed or abstract, 3) the complex material on static electricity and humans digestive system is a challenging material in its delivery in junior high school level since the developmental students' ability of cognitive visualization, so the teacher needs a media that can help to visualize the procedure of creating an electrical circuit and digestive process, 4) the learning media needs to be developed in learning the subject of is in the form of media audiovisual by some consideration on characteristic and basic need of students' level.

Based on the above conclusions, it is recommended 1) the development of audio-visual media the subject of static electricity and humans digestive system for junior high school in the form of virtual laboratory, 2) for every teacher in junior high school, it is hoped that later they can use audio visual-based or another media to support the visualization the subject of static electricity and humans digestive system or other similar conceptual material and are also expected to be able developing themselves for several different media and material, 3) for local government and school leaders can provide both moral and material support related to the use of audio-visual based media through the provision of facilities and infrastructure in schools, improvement, and understanding of its importance the use of media to teachers, foster the potential of teachers to create their self-developed media and create a sense of security and build motivation in learning for students.

Fen Materyallerinin Öğretiminde İşitsel ve Görsel Ortamların Geliştirilmesine Yönelik İhtiyaç Analizi

Özet

Bu nitel çalışmanın amacı, ortaokul fen öğretimi sürecinde eğitim ortamlarının kullanımının mevcut durumu hakkında genel bir değerlendirme yapmak ve statik elektrik ve sindirim sistemi konularında ihtiyaç duyulan öğretim araçlarını belirlemektir. Çalışmanın katılımcıları, Endonezya- Surakarta'da yer alan bir ortaokulda 20 öğretmen ve öğrenciden oluşmaktadır. Veriler, 2019-2020 akademik yılında çevrimiçi ortamda anket aracılığıyla toplanmıştır. Sonuçlar, fen öğrenimi sürecinde mevcut öğretim aracı kullanımının, seçme ve kullanma kolaylığına sahip olduklarından etkili ve verimli bir şekilde gerçekleştirilemediğini göstermiştir. Ayrıca sonuçlar, öğretmenin ders sürecini görselleştirmek ve konuları doğru bir şekilde açıklamak için bir araca ihtiyaç duyması nedeniyle zorluk yaşandığını göstermiştir. Buna ek olarak sonuçlar, fen öğreniminde özellikle görsel-işitsel araçların geliştirilmesine ihtiyaç bulunduğunu göstermiştir. Bu sonuçlar, ortaokul fen derslerinin tasarlanmasında ve öğrenme ortamlarının geliştirilmesinde dikkate alınabilir.

Anahtar kelimeler: ihtiyaç analizi, medya, görsel-işitsel, statik elektrik, sindirim sistemi

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Book Review: Blockchain Technology Applications in Education

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Book Review

Abstract

This book is edited by Ramesh Chander Sharma, Hakan Yildirim, Gulsun Kurubacak. The 1st edition of the book was published in 2020, IGI Global. The book has a total of 336 pages. The metadata of the book is as followings: ISBN13: 9781522594789, ISBN10: 1522594787, EISBN13: 9781522594796, and DOI: 10.4018/978-1-5225-9478-9.

Keywords: Blockchain, lifelong learning, higher education, distance education, digital transformation.

1. INTRODUCTION

This book is edited by Ramesh Chander Sharma, Hakan Yildirim, Gulsun Kurubacak. The 1st edition of the book was published in 2020, IGI Global. The book has a total of 336 pages. The metadata of the book is as followings: ISBN13: 9781522594789, ISBN10: 1522594787, EISBN13: 9781522594796, and DOI: 10.4018/978-1-5225-9478-9.

First became popular with Nakamoto's (2008) seminal paper, Bitcoin: A Peer-to-Peer Electronic Cash System, blockchain technology aroused a lot of attention. Blockchain is an online decentralized and distributed ledger technology that has the ability to keep and track records in a safe, verifiable, and transparent manner. Bozkurt (2018, p. 104) summarises blockchain technology as follows: Blockchain technology is a distributed and cognitive record book and it can be defined as a new generation, global and decentralised infrastructure or mechanism. Blockchain technology first came up with bitcoins and has been used in various fields including education due to the superiorities it ensures, and as reported Sharples et al. (2016), it has great potential to be used in educational processes.

About the Book

The edited book entitled Blockchain Technology Applications in Education has a total of 14 chapters. It mainly covers issues on blockchain technology and its applications in lifelong learning, higher education, open and distance learning. It also discusses virtual identity in blockchain, the strategy and management of blockchain in social transformation, and blockchain-based academic certificate management.

The first chapter, authored by Bozkurt and Ucar (2020), is entitled **Blockchain Technology as a Bridging Infrastructure Among Formal, Non-Formal, and Informal Learning Processes**. The chapter suggests that blockchain technology has the potential to link different modes of the educational process, and therefore, promises a lot for lifelong learning. Different modalities of learning (formal, non-formal, informal), blockchain technology, and its current use in educational processes are also explained. The authors suggest, based on the findings, that blockchain technology can be used to connect and interlink different educational experiences that occur in different educational modalities, enabling us to evaluate educational processes holistically and thus promote lifelong learning through the use of cutting-edge technologies.

The second chapter, authored by Mikroyannidis, Third, Domingue, Bachler and Quick (2020), is entitled **Blockchain Applications in Lifelong Learning and the Role of the Semantic Blockchain**. Blockchain's debut assures to transform both lifelong learning and the financial world in many ways. This chapter looks into the various aspects of lifelong learning which are affected by this new paradigm and describes an ecosystem in which the learner is at the centre of the learning process and its associated data. What is also discussed in this chapter are the possibilities that will be afforded by the combination of trustworthy educational data enhanced with meaningful web-accessible linked data, and what these developments will mean for learners, educators, and the employment market.

The third chapter, authored by Ciftci (2020), is entitled **Change of the Learning Cycle After Blockchain: Chaining Trust Society**. This chapter aims to create a foresight related to the role of using blockchain to meet the learning needs and how it may change the learning cycle in the 21st century. The author first gives an explanation of the development of digital learning by describing the paradigm changes in lifelong learning activities. The author also explains the learning needs of the 21st century within the framework of constructivism and connectivism in

terms of changes in learning tendencies. The problems encountered in the new learning tendencies were examined in the context of critical theory. A definition of blockchain is also provided to determine how it can respond to problems in learning. The areas where blockchain can be used and the innovations it can bring to the field are interpreted. In the end, the author synthesizes learning and blockchain issues, and discusses how these can be used in learning applications, and how they can respond to learning needs.

The fourth chapter, authored by Bittencourt, Goedert, Sharma and Bortolozzi (2020), is entitled **Framework Blockchain Education: Rupture in Higher Education**. In this chapter, the authors point out the higher education sector, which needs to go beyond the pedagogical and material limits in order to give to the student the protagonism of his/her life story. They provide a definition of the word "rupture", which means to abstract the methods and models for living together in an environment of strong interactions and relationships, whose transactional cost becomes evident. Thereupon, this chapter presents a framework in an ecosystem of changes, feeds, analyses, diagnostics, and intelligence, which contributes to the formation of the student according to his/her expectations, that is, to contribute in an effective manner in his/her achievement, while offering a sustainable education.

The fifth chapter, authored by Hussain and Cakir (2020), is entitled **Blockchain Technology in Higher Education: Prospects, Issues, and Challenges**. This chapter explains the potentials of blockchain technologies in higher education along with its issues and challenges and provides detailed explanations and reasons for that. In sum, the authors state that blockchain stems in decentralization and distributed learning with characteristics of permanence of records, pursuit and transfer of knowledge, authority of institutions, and reliability of teaching and learning. So these characteristics of blockchain attract educational institutions, particularly the higher education institutions, to adopt it; however, despite all the potential and benefits of blockchain technology, the higher education stakeholders currently seem to be less aware of the social benefits and educational/ instructional potential of blockchain technology. The authors claim that blockchain technology can be addressed through proper advocacy and campaign.

The sixth chapter, authored by Sousa and Machado (2020), is entitled *Blockchain Technology Reshaping Education: Contributions for Policy*. The aim of this chapter, which is an

exploratory study which focused on blockchain technology applied to European Union education policy, is to analyse the potentials of blockchain in education. To achieve this goal, a bibliometric analysis was conducted in order to identify studies already done on blockchain applied to education, and the main research items studied and how they can contribute to policy definition. The research question of this study is: What kind of contributions for policy emerge from the research that has been made on blockchain in education? The main findings are focused on getting a diploma, on the assessment, and the formative evaluation, but also related to the learning process in a distributive way to facilitate the educational management process.

The seventh chapter, authored by Kant (2020), is entitled Blockchain: **A Resource of Competitive Advantage in Open and Distance Learning System**. This chapter is an exploratory study that considers blockchain as a resource of competitive advantage for ODL system. The author also explains the relation between blockchain technology and the ODL system, states the opportunities and potential risks of embracing blockchain in ODL, yet also mentions the advantage by enhancing capabilities of combining resources. The significance of the chapter will be for the professionals, policymakers, researchers, governments, and regulators.

The eighth chapter, authored by Sathler (2020), is entitled **For an Open Innovation Platform Dedicated to Education: A Blockchain Approach**. In this chapter the author focuses on the innovation ecosystem dedicated to education in Brazil and argues that it has been strengthened, but it is still far short of the needs of society and the potential that technology brings. The author also states that the imperative of transformation is articulated by urgency and by the comprehensiveness and that Brazil's strategy of public financing to education would include new edtech products and services previously tested, validated, and priced by reverse auction made available in a national marketplace. It is also claimed that each municipality or school would be able to define its priorities for the acquisition of technology products and services and any software developed or made available by this open innovation platform should follow the guidelines of a free software. The author also claims that the training of teachers, managers, and staff would be an obligatory part of the adhesion, being primarily online. Moreover, students and their families would also be included as potential users by a blockchain approach.

The ninth chapter, authored by Tugtekin, Dursun and Ugur (2020), is entitled **Virtual Identity in Blockchain**. In this chapter the authors focus mainly on virtual identity in blockchain. They claim that a blockchain-based virtual identity is no longer a really different identity today; instead, it now has a form that allows individuals to produce and manage their virtual identities and facilitates their lives. In addition, its usage potential has led to the use of blockchain for institutional purposes, and so it is now possible for institutions to interact with their stakeholders via their institutional virtual identities. The authors also state that virtual identities play an important facilitator role in communication to be established by educational institutions with their students especially at higher education level.

The tenth chapter, authored by Rodrigues, Franco, Scheid, Kanhere and Stiller (2020), is entitled **A Technology-driven Overview on Blockchain-based Academic Certificate Handling**. What is discussed in this chapter are the main proposals toward the handling of academic certificates from a technological point of view and the technical aspects that may influence the relationship between confidentiality and transparency as well as application requirements such as performance and reliability in contrast to the blockchain characteristics. The chapter also sums up the key challenges and opportunities based on this discussion that outline future directions for academic certificate management.

The eleventh chapter, authored by Moraes (2020), is entitled **Blockchaining Corporate Education**. In this chapter, the author states that all of remarks of Roger Deacon, who is researching the relevance and implications of the work of Michel Foucault for education, lead to concerns about the idea of blockchain for corporate education. The reason for this is that the life of an individual may be registered from the very beginning throughout the whole educational system. The author questions how one should think about corporate education in a scenario in which even computer-driven choices are biased and even the peer-to-peer system with a blockchain system may be circumvented. And finally, the author suggests that so as to keep a corporate performing well, the multiple skills of collective games could indicate the need for multiple intelligences.

The twelfth chapter, authored by Nery, Macambira, Mota and Rezende (2020), is entitled **Social Media, Cyberculture, Blockchains, and Education: A New Strategy for Brazilian Higher Education**. This chapter aims to contribute to the debate of the uses of social media, cyberculture, and blockchain technology for the development of educational strategies.

Therefore, it reviews the existing scientific literature on social networking, social media, cyberculture, and blockchains related to Brazil. The chapter focuses on Brazil because higher education in Brazil has taken a significant turn recently with the substantial reductions of government investments in social justice policies.

The thirteenth chapter, authored by Altinay Aksal, Bicen and Altinay Gazi (2020), is entitled **Blockchain Strategy and Management in Social Transformation for Being Social Agents**. This chapter promotes the virtues of new learning and teaching by having a closer look at educational technology. Transformation becomes a crucial attempt for social changes and development, so the practice of online education and reflections clarify being a social agent and make an innovation in pedagogy. This chapter also emphasizes the transition and quality framework and the role of blockchain strategy and management and strategies and policies in establishing social agents for the diffusion and development of equality and access, openness in education.

The fourteenth chapter, authored by Mahankali and Chaudhary (2020), is entitled **Blockchain Education: A Comprehensive Approach**. The authors examine the usefulness of blockchain technology-led digitization, automation of trust, and disintermediation in the education sector in this chapter. They explore some of the remarkable use cases and challenges that are encountered by blockchain technology. They also study the current state of blockchain technology-enabled applications in related domains and its implications for the education sector in India along with a real-life illustration with implementation using AuxCert on Auxledger, a permissioned blockchain platform from Auxesis group.

Conclusion and Suggestions

Blockchain Technology Applications in Education is an essential book for researchers, academicians, curriculum designers, instructional designers, IT consultants, administrators, researchers, and students might benefit from this book because it includes a variety of topics such as new management models, communicational actions, pedagogical approaches, new technologies, and evaluation models, and it examines how open universities establish a blockchain network for decentralized learning. The chapters provide plenty of information about these issues, state possible challenges and offer solutions to them, all of which enlighten the readers as well as provoke further thought. In the future version of the book, applied

researches might be focused on so as to perceive the opportunities created by the blockchain technology and to develop a policy.

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Book Review: Utilizing Technology, Knowledge, and Smart Systems in Educational Administration and Leadership

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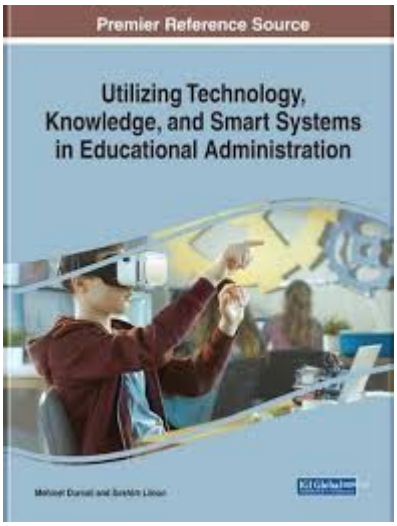
Book Review

Abstract

Utilizing Technology, Knowledge, and Smart Systems in Educational Administration and Leadership is edited by Mehmet Durnali. The book was published in 2019 by IGI Global. The book has xxviii+364 pages. The ISBNs of the book for different versions are; ISBN13: 9781799814085, ISBN10: 1799814084, EISBN13: 9781799814108. DOI number of the book is 10.4018/978-1-7998-1408-5.

Keywords: Gamification, Distance and Adult Learning, M-Learning, Computer Applications, Classroom Management, E-Curriculum.

1. INTRODUCTION



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Within educational organizations, administration and leadership are relied upon for the allocation of resources as well as the optimization of processes that can include data storage, knowledge management, and decision making. To support these expectations, technologies, knowledge, and smart systems must be put into place that allow administrators and leaders to accomplish these tasks as efficiently as possible. Utilizing Technology, Knowledge, and Smart Systems in Educational Administration and Leadership is an academic research book that examines knowledge regarding the scholarly exploration of the technologies, information/knowledge, and smart

systems in educational administration and leadership. It provides a holistic, systematic, and comprehensive paradigm. Featuring a wide range of topics such as technology leadership in schools, technology integration in educational administration, and professional development, this book is ideal for school administrators, educational leaders, principals, IT consultants, educational software developers, academicians, researchers, professionals, educational policymakers, educators, and students.

2. REVIEW OF THE BOOK

The topics addressed by the authors of 16 chapters are as follow:

Chapter 1: Managing the Utilization of Technologies in Adult Education, Training, and Administration: The Case Study of Turkish MoNE by Mehmet Durnali. In Chapter 1, The chapter aims to investigate and discuss the technologies in Turkey's adult education system in a holistic, systematic way and within a framework with a theoretical basis for the use of the computer, the internet, and web-based technologies in adult education, training, and administration.

Chapter 2: Administering Education and Training Through a Web-Based System: E-Curriculum by Tuncer Susam, Mehmet Durnali and Şenol Orakci. The chapter aims to describe e-Curriculum System of the Turkish Ministry of National Education (MoNE) in the context of administering education and training. The system, as a web-based educational administration tool, its benefits to administering, and importance of it were introduced at first.

Chapter 3: Technology for Classroom Management by Pinar Ayyildiz. The chapter aims to resort to technology highlighting the positive links between technology use in the classroom and management practices with a view to sharing some of the existing practices. Educational policies should be scrutinized to provide the optimum - if not the best - conditions for learners of every level with the help of incorporating 'suitable' educational technologies in light of the contexts where teaching and learning take place.

Chapter 4: Technology Leadership in Turkish Schools: A Systematic Review by Selahattin Turan, Mahmut Polatcan and Ramazan Cansoy. In Chapter 4, the authors systematically

evaluate theses and articles that were published between the years 2000-2019 in Turkey related to school technology leadership in terms of their topics, methods, results, and recommendations.

Chapter 5: Contribution of EMIS Platforms to Education Management and Recent Applications by Mehmet Akif Ocak and Abdullah Alper Efe. In Chapter 5, the authors investigate the effect of educational management information systems (EMIS), which has a great importance in educational organizations. This chapter focuses on data process, analysis, synthesis, and design process of educational management information systems. This chapter, in depth, argues data storage, accuracy, planning, scalability, and transparency issues of EMIS systems. The focus is on how using EMIS systems helps educational administrators and decision makers as well as educational systems and economy.

Chapter 6: An Evaluation on the Management Processes of FATIH Project by Mehmet Akif Ocak and Abdullah Alper Efe. In Chapter 6, the authors investigate the FATIH Project in terms of educational administration and management processes. An extended literature review is conducted on how decision makers and administrators contribute the diffusion of FATIH Project and evoke necessary changes to transform education in classroom discourse and pedagogy.

Chapter 7: Technology Integration in Educational Administration by Gozde Sezen-Gultekin and Nazire Burcin Hamutoglu. In Chapter 7, the authors start with overview on the current situation of education by referring to educational policies, development plans, international reports and contemporary applications of educational policies, and continues with addressing the definition, application areas, examples and next generation applications of technology integration at national and international levels within the scope of educational policies and development plans.

Chapter 8: Knowledge Management for Education Administrators by Ayça Kaya. In Chapter 8, the author presents how knowledge management benefits schools when applied in an ecological framework by practicing upon the business theories of information management and knowledge management.

Chapter 9: Information and Communication Technologies Literacy: Planning of Teachers' Information and Communication Technologies Training in Turkey by Ömür Çoban. In Chapter 9, the author evaluates the teacher trainings given within the scope of the FATIH Project. The research focuses on training planners, trainers, and training areas to evaluate the training of the project.

Chapter 10 : Re-Establishing the School in the Light of Information Technology by Süheyla Bozkurt. In Chapter 10, the author opens the discussion of the concept of education and school that emerged as a result of the changes in information technologies and to provide insight into the future educational institutions.

Chapter 11: Social Media Integration in Educational Administration as Information and Smart Systems: Digital Literacy for Economic, Social, and Political Engagement in Namibia by Sadrag Panduleni Shihomeka and Helena N. Amadhila. Chapter 11 covers discussions on social media technologies that are being used as channels to foster various developments. The chapter used the integrated knowledge management cycle to explain how individuals are being developed economically, socially and politically through social media technologies.

Chapter 12: Gamification in Classroom Management by Murat Topal and Gozde Sezen-Gultekin. In Chapter 12, the authors focus on the topic of gamification in classroom management. In this context, firstly, the definition, characteristics, theories of class management, and the strategies used in classroom management are defined, and then gamification as the next generation strategy is discussed.

Chapter 13: Sub-Dimensions in the Management of Open and Distance Learning by Hakan Altinpulluk. In Chapter 13, the author examines the management dimension in ODL systems in all aspects, supported by reports from reputable organizations and other studies in the literature. The chapter also describes the financing, marketing steps, information systems, benchmarking, quality and accreditation processes of the ODL institutions' management in terms of various components from those in the on-campus educational institutions and have a hierarchical structure within themselves.

Chapter 14: Shaping School Culture With Technology: Impact of Being an eTwinning School on Its Climate by Lamia Büşra Yeşil. In Chapter 14, the author discusses the impact of using technology on school culture along with its effects on the organizational climate. Accordingly, the views of 11 school administrators about integrating technology to the school culture and their preferences on using web 2.0 tools as a leader are presented.

Chapter 15: Effect of Administration Support on Teachers' ICT Utilization in the Malaysian Context by Simin Ghavifekr and Tan Yi Quan. In Chapter 15, the authors presents a comprehensive review of the relevant literature regarding ICT utilization and Administrative supportsin education settings. In addition, this chapter elaborates on the relevant theories to technology use and administrative supports and their key dimensions.

Chapter 16: Web-Based Responsive Mobile Learning (M-Learning) Design by Alaattin Parlakkılıç. In Chapter 16, the author presents a conceptual review on mobile learning as an initiative to leverage ubiquitous mobile technology for the adoption or augmentation of knowledge, behaviors, or skills through education, training, or performance support while the mobility of the learner may be independent of time, location, and space. The chapter also discusses the 5 steps responsive design for m-learning contexts that can be used across platforms and offers design of courses according to relevant instructional strategies.

3. CONCLUSION

This book attempts to assist educators, administrators and leaders to share some attempts in developing a clear understanding of various ICT-based learning approaches and pedagogical models via technology utilization to improve learning experiences, developing skills, competencies, creativity and critical thinking. Moreover, this book aims at developing students' digital understanding while they utilize technology to adapt to new learning contexts.

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Can Güldüren is an assistant professor in the Department of Computer Technologies at Ufuk University, Turkey. After graduation from Army Academy he also completed his information systems education in Computer Engineering and Information Technology, Middle East Technical University/ Turkey. Güldüren holds an MA degree in Management and Organization in Selçuk University. Güldüren holds an MA and a Ph.D. degree in Computer Education and Instructional Technologies in Ankara University. His research interests lie broadly in information security, web programming, educational social networks, Augmented Reality, Artificial Intelligence and Virtual Reality, health informatics, e- learning, assistive technology, new learning technologies, personal learning environments (PLEs), technology-supported practices, and use of ICT in education.

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