

GeeksFelting: Web-based Learning for Needle Felting Craft

NabilFikri Md Sabani, Nor Asiah Razak*

Computing Department, Fakulti Seni, Komputeran & Industri Kreatif, Universiti Pendidikan Sultan Idris; d081683@siswa.upsi.edu.my, norasiah.razak@fskik.upsi.edu.my

**correspondence author*

To cite this article (APA): Sabani, N.M., & Razak, N.A. (2022). GeeksFelting: Web-based learning for needle felting craft. *Journal of ICT in Education*, 9(3),51-61. <https://doi.org/10.37134/jictie.vol9.sp.1.5.2022>

To link to this article: <https://doi.org/10.37134/jictie.vol9.sp.1.5.2022>

Abstract

Countries are at various stages of Covid-19 infection, and millions of children in multiple nations are currently affected by school closures due to the pandemic. The covid-19 pandemic has altered the way students are educated globally in a short period of time via the internet. Nowadays, the internet as a source of knowledge become a requirement for learners to acquire learning materials. Given the current situations and opportunities of COVID-19, students have difficulty learning the craft as drastic changes from the physical classroom to online as the classic style to learn needle felting craft is face-to-face. The problem arises when the student does not have the appropriate platform to learn needle felting craft. Needle felting is a craft that transforms wool into 3D shapes by using a special needle to tangle the wool together. Thus, GeeksFelting: Web-based learning for needle felting craft is a learning alternative platform for students. This web-based system provides an on-demand course from basic to expert. Students also can comment on the discussion section to connect with other students, sharing content and ideas as these features can bring the learners to engage although they are not physically present for learning. This system is developed based on an evolutionary prototyping model and the evaluation is conducted through questionnaire instruments, which involve 30 respondents. Evaluation is to test the usability of the system and the findings indicate that the system is efficient and satisfies users to use. The study offers several significant contributions with regard to the practical and the body of knowledge as the interested parties can understand the element of needle felting craft and a web-based application able to assist learners in learning needle felting craft.

Keywords: needle felting craft, Covid-19, web-based application, geeksfelting, craft learning

INTRODUCTION

The Covid-19 pandemic has raised concerns about several key aspects of the national or global social system, including education affecting nearly 1.6 billion students in over 200 countries (Pokhrel & Roshan, 2021). Countries are at various stages of covid-19 infection, and millions of children in multiple nations are currently affected by school closures due to the pandemic. The pandemic forced schools to shut down for an indeterminate period of time, impairing the learning environment for students. Moreover, the abrupt shift from traditional learning, which incorporates face-to-face classes, to online education has created difficulties for students in adapting to the new environment. In this sense, the Covid-19 pandemic has altered the way students are educated globally in a short period of time via the internet (Chung, Subramaniam, & Dass, 2020).

The internet as a source of knowledge is becoming a requirement for learners to find learning materials nowadays. The influence of web technology as a tool for aiding education has opened the possibility of delivering the most engaging learning. Thus, the aim of this research is to develop and utilize web technology to teach students about needle felting craft. This research development selected needle felting because the craft offers many benefits besides being a hobby during leisure time

Needle felting is a craft that transforms wool into 3D shapes by using a long needle with small reverse hooks to tangle the wool together Dalkiran and Karakul (2018) explain that the needle used for needle felting is a long needle with small reverse hooks. Some researchers have emphasized the importance of craftsmanship and craft ideas (Huotilainen, Groth, Rankanen, & Seitamaa-hakkarainen, 2018)

The development of the research will create a web-based learning platform. The system's design will focus on two main aspects: multimedia elements and the website's usability. Dinc (2017) explains that multimedia elements are an attractive tool for students' active learning to spread information. The project was built as a web application because the student is easy to access the educational content. Students can use the software for any device by installing the browser. Students can use the software for any device by installing the browser. Then, the development of the project will use MERN stack as the framework.

PROBLEM STATEMENT

Many countries are at various stages of COVID-19 infection, and millions of children in multiple nations are affected by school closures due to the pandemic. The covid-19 pandemic has transformed the way students are educated in a short period of time (Pokhrel & Chhetri, 2021). The sudden switch away from the offline learning environment posed a challenge for students wishing to learn needle-felting crafts. Thus, the development of GeeksFelting Web-Based Learning had the potential to aid students in learning needle felting craft. However, the current learning platform that provides needle felting craft tutorials does not offer a free course such as Udemy. Udemy does not provide courses for free and the starting price from 10.99 USD (Cetina et al., 2018). This might burden for the student to access the learning material especially low-income country students to learn needle felting crafts. The creation of GeeksFelting Web-Based Learning is necessary to provide students with free learning material. Therefore, three objectives had identified to achieve the aim of the research are follows: 1) to identify the problems with an existing web-based system to learn needle felt, 2) to develop the Geeks Felting Web-Based Learning by using HTML, CSS, and JavaScript to help students in learning needle felt craft, and 3) evaluate the usability of the Geeks Felting Web-Based Learning to help students in

learning needle felt craft. Three research questions are as follows: 1) what are the problems with an existing web-based system to learn needle felt?, 2) how to develop Geeks Felting Web-Based Learning by using HTML, CSS, and JavaScript to help students in learning needle felt craft?, 3) what is the usability of Geeks Felting Web-Based Learning to help students in learning needle felt craft?

LITERATURE REVIEW

The literature section only discusses Based on the literature, four themes emerged: 1) benefits of crafting; 2) web-based learning; 3) web-based application framework, and 4) problems with the existing web-based application to learn needle felt craft.

Benefit of Crafting

Crafting has three benefits. First, interest in crafts has risen as people acknowledge the enjoyment of craft activities (Huotilainen et al., 2018). Besides, the craft is an excellent option to fulfil leisure time, craft offers many benefits to the crafter. Crafting helps to build a person's self-esteem through the creation of an original product from their hand and the time spent crafting increases the sense of achievement and self-assurance. Second, crafting shows to be a stress reliever. Some researches show that craft clears the way for emotional stress by triggering feelings of peace and empowerment (Huotilainen et al., 2018). In addition, people could relieve negative emotions such as anxiety and sorrow regarding their primary concerns in life. Individuals' sentiments can be soothed through homemade crafts while still completing productive tasks during their leisure time. Last, crafting provides a therapeutic effect on the body. Making art and craft has therapeutic benefits, not just in providing a means of self-expression but also in lower blood pressure and strengthening the immune system (Huotilainen et al., 2018). Thus, the craft helps in handling unresolved emotions and increases the quality of life.

Some researchers have begun to appreciate the importance of both craftsmanship and the craft's core values (Huotilainen et al., 2018). The development of GeeksFelting: Web-Based Learning for Needle Felting Craft would take the numerous advantages offered by crafts that extend beyond simply allowing the student to express themselves creatively.

Web-based Learning

The rise of the internet as the source of knowledge and the advancement of web technology has impacted education. Websites play a significant role in learning, and web-based learning is a prime example (Dinc, 2017). The ease of quality education through the existing web-based system changed the concept of traditional education radically.

The use of multimedia elements is an appealing tool for the students learning process. The combination of multimedia elements such as sound, image, video, and animation enhances the learning experience for the students through web-based learning. Multimedia elements aid in transmitting content to ensure

that it reaches the intended audience (Dinc, 2017). The development of the GeeksFelting Web-Based Learning System for Needle Felting Craft considered the use of images and video to guide the students when using the website.

Dinc (2017) explains that if the website targeted students, the students' aspects should be considered. For example, a student with visual impairment, hearing impairment, and physical disabilities. The website should be optimized and accessible to ensure that it is welcoming students with special needs. The development of the GeeksFelting: Web-Based Learning for Needle Felting Craft considered adding alt text to all images, choosing color carefully, and making sure all content is easily accessible.

The preparation to build a well-design website is necessary to create a high-quality educational website. Appropriate multimedia elements and the website's usability are necessary aspects for developing the GeeksFelting: Web-Based Learning for Needle Felting Craft.

Web-based Application Framework

The web application is a computer program run on the web server and accessible to any suitable browser. Web applications can facilitate widespread adoption as they can run on multiple platforms, desktops, or smartphones. Users can run on the device's browser and do not need any additional installation and eliminate the space used on the user device. The advancement of web technology, which has grown tremendously, has developed many libraries and frameworks that made developers work conveniently. MEAN and MERN is the two widely used JavaScript stacks with differences in the front-end technology use (Aryal, 2020).

MERN stands after the four key technologies that make up the stack: MongoDB, Express.js, React.js, and Node.js. React.js uses for Front-end development, Express.js is used as a server-side framework running inside a Node.js server in back-end development, and MongoDB plays a role in database management. React is an extensively used open-source, scalable, and component-based JavaScript library that supports creating dynamic user interfaces (UI) with reusable modules that can implement in multiple projects (Aryal, 2020). The reusable UI is the main reason why the MERN stack is selected, as it will cut the development time. Moreover, the codebase is much simpler with unlikely to have bugs since the same code is used.

Node.js is the most common open-source web server environment at the moment as it allows JavaScript programming to work independently from the web browsers (Aryal, 2020). Node.js is selected for development because it offers a considerable number of free tools. Aryal (2020) found that Node.js offers tools and functions including Node Package Manager (NPM) that assist in third-party handling libraries such as Mongoose and Express, which speeds up the development process.

Express.js is a web application framework and one of the Node.js libraries. Express.js provides server-side logic for the web application to boost the usability of the web with the use of an API application. The express.js used in this project to connect with third-party API to increase the efficiency of the web

application.

MongoDB is an open-source database and is classified as a NoSQL database program. NoSQL database provides storage for data management other than tabular relations. MongoDB System Properties (Aryal, 2020) stated that NoSQL had better performance than SQL. The reason MongoDB was chosen is faster than the SQL database.

Problem with the Existing Web-based Application to Learn Needle Felt Craft

Based on the first research objective to identify the main problem with the existing web-based application to learn needle felt craft Three similar projects had identified which is likely to be used by people to learn the craft, namely Udemy, Coursera, and Khan Academy. All the chosen project explained in detail their characteristics and features offered for the target user.

Udemy

Udemy is an online learning platform that offers many courses in 14 categories, including art and crafts. Udemy serves as a model for every online learning site to guide quality standards with over 65,000 courses and 20 million students (Cetina et al., 2018). The dedication of Udemy to supporting teachers as much as learners are what distinguishes Udemy from other online learning sites. Udemy provides flexibility for teachers to develop entire courses and deliver lessons online. Udemy allows teachers to draft their content and provide many tools and features to support the learning environment such as uploading video content, text notes, multiple choices quiz, and certificate completion certificates.

The disadvantage of Udemy is not backed up by top universities. The certificates of completion of the courses are non-Accredited certificates and not backed by top institutions. Moreover, most of the high-quality course is available as paid course. Udemy was seen as a corporation, whereas some platforms are non-profit (Cetina et al., 2018).

Coursera

Coursera is a learning platform that covers many courses, including specializations and degrees. The partnership with the best and most famous colleges that offer the learning material on the sites is what significantly distinguishes Coursera from the competitor. The courses offer by Coursera are of decent quality thanks to the platform's affiliation with top institutions (Cetina et al., 2018). The Coursera suit for a student who is in pursuit of a professional or certified academic course.

Coursera's service price at 49 USD, subscription monthly (Cetina et al., 2018). The price might burden a low-income country student to access the learning material and get the professional certification to apply for a job. However, Coursera also provides a 7-day free trial to access the content and financial assistance. Coursera provides a certificate of completion for a course. The student needs to accomplish all essential tasks in the program or achieve the accumulated classified course's passing threshold as

the requirement. Then, Coursera also offers many learning options such as single courses, specializations, and bachelor's degree programs from accredited universities.

Khan Academy

Khan Academy is an online learning platform that enables everyone to access learning material and develop their education. Khan Academy runs by a non-profit educational organization intending to provide education to those who cannot support or access it. The platform center on voluntary work and charitable contributions from many foundations as financial support includes from Bill and Melinda Gates Foundation (Cetina et al., 2018).

Besides providing high-quality video content and various exercise, Khan Academy also provides gamification elements to enhance the learning experience. Tenório, et al, (2017) explains that gamification is a strategy for increasing motivation, interaction, and dedication through the implementation of game elements and mechanisms into "non-game" contexts. Gamification has a direct influence on student motivation both extrinsic and intrinsic motivation. The unique game design based on the (Role-Playing Game) RPG element offered by Khan Academy strongly appeals to students that indirectly affect intrinsic motivation. The use of levels and game badges in Khan Academy as a reward after accomplishing a task affects the student's extrinsic motivation.

However, the disadvantage of Khan Academy is not offer many subject categories. Khan Academy mainly focuses on math and science content for learning sources. Hence, restricts the number of students from a variety of education fields to take advantage of the free course provided by the Khan Academy as there is a lack of resource for it.

METHODOLOGY

GeeksFelting Web-based Learning utilized the evolutionary prototyping model as the development strategy. This model allows users to provide early feedback during the prototyping process, which improves project performance by directly involving the stakeholders. This model divides into two stages of development: prototype development and iterative development. The prototype development process began with requirement collection and support by a cycle that included a quick conceptual design, a construct prototype phase, a customer review of the prototype phase, and a refine requirements phase that included customer recommendations. The development will continue with iterative development, which starts with design, coding, and testing and ends with maintenance as shown in Figure 1.

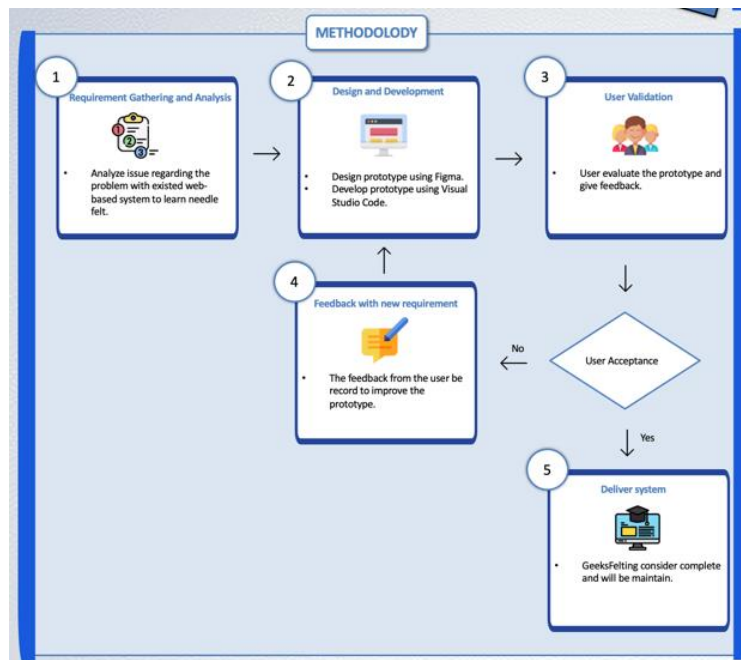


Figure 1: Phase in the evolutionary prototyping model in GeeksFelting web-based development

Initial Requirement

In the initial requirement phase, the idea to build the GeeksFelting Web-Based Learning obtain from brainstorming to identify the requirement of the system. Then, articles related to needle felting crafts by an existing system related to this project are analysis obtained from Google Scholar. Meanwhile, the prototype is developed and evaluated by the stakeholders in the prototyping method. By gathering requirements, researchers come out with the first and second objectives.

Document analysis provides information about existing products that are being developed as well as what software is intended to be employed. Visual Studio Code, Figma, and Xampp were chosen as applications for this project's development. After the requirement had been confirmed, the design and development phase started.

Design and Development

Figma utilizes to create the website's design, while Visual Studio Code and Xampp are used to design the website's interface and database. In Visual Studio Code, the researcher utilized the HTML, CSS, and JavaScript language to create all the application's interactions, ensure that all buttons could function, and ensure that video could include in the application itself. This GeeksFelting Web-Based Learning System has five primary functions, namely, courses, inventory, sign up, login and logout. There are no restrictions on accessing all functions, and users are free to explore the application at their own speed. This system also has four main user interfaces, namely login page, course page, discussion page, and inventory page as shown in Figure 2.

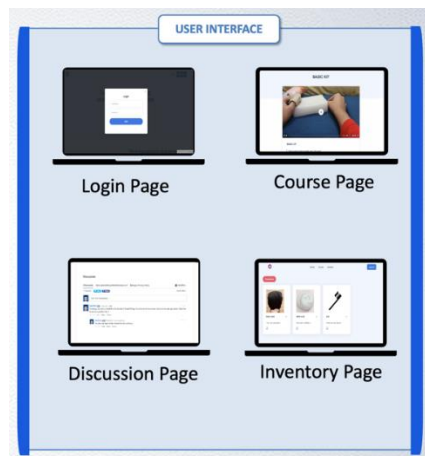


Figure 2: User interface for GeeksFelting web-based system

Functions ‘course page’ is the user can view the courses about needle felting craft. Users can add comments on each course in the discussion section. Users can go back to Home by simply clicking the home button. Functions ‘inventory page’ to which the user can add a list item of needle felting crafts into the database. It consists of images and numbers of items for every item added. Users can delete the item from the list by simply clicking on the items. By clicking on the home button, the user can go back to the home button. Functions ‘login page’ is the user can log in by providing the username and password used during the sign-up session. The user will automatically direct to the homepage after success logging in. Users can quit the application whenever they want. By clicking on the logout button, the user can log out.

The design of the main menu interfaces is crucial because it gives the user the first impression of how the design of the interfaces for the entire application will look. Figure 3 depicts the ‘Main Menu Page’, which includes the logo GeeksFelting, on the left side of the interface, the buttons for the homes, courses, and inventory located on the middle side while the logout buttons are located on the right side. When a button is pressed, it takes you to the next interface.

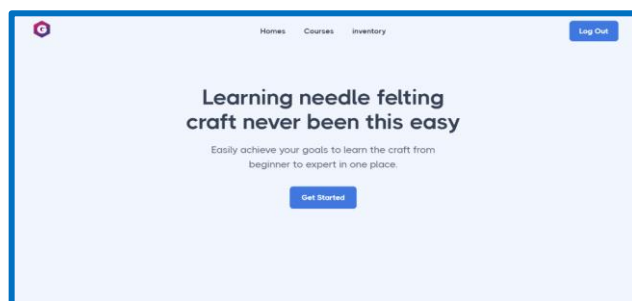


Figure 3: Main menu page for GeeksFelting web-based system

FINDINGS

Evaluation is required to decide regarding an application or improve its functionality of GeeksFelting Web-Based Learning. Quantitative research involves a questionnaire using Google Form as an online tool to acquire data from the users. The sample for this study is the students from Universiti Pendidikan Sultan Idris (UPSI). 30 respondents are chosen to test the functionality of GeeksFelting Web-Based Learning. Then, the respondents are required to complete the SUS questionnaire.

The item in the questionnaire is based on System Usability Scale (SUS). The SUS was originated by John Brooke and with a 10-item Likert Scale question about a system’s usability (Holden, 2020). The following steps determine the System Usability Scale (SUS) final score. The final score of the SUS score calculation will need to refer to SUS Score Guideline as shown in Figure 4. The result obtained from the questionnaire session from 30 participants summarize as shown in Table 1. Figure 5 indicates a bar graph of Usability Evaluation for GeeksFelting Web-based Development.

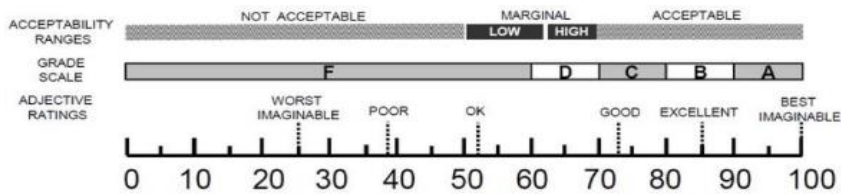


Figure 4: System usability scale (SUS) score guidance

Table 1: Data from the Questionnaire

Scale/ Question	1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly Agree
1. I think that I would like to use this system frequently.	0 (0%)	0 (0%)	2 (6.7%)	7 (23.3%)	21 (70%)
2. I found the system unnecessarily complex.	10 (33.3%)	3 (10%)	2 (6.7%)	8 (26.7%)	7 (23.3%)
3. I thought the system was easy to use.	0 (0%)	0 (0%)	3 (10%)	10 (33.3%)	17 (56.7%)
4. I think that I would need the support of a technical person to be able to use this system.	15 (50%)	4 (13.3%)	4 (13.3%)	4 (13.3%)	3 (10%)
5. I found the various functions in this system were well integrated.	0 (0%)	1 (3.3%)	2 (6.7%)	7 (23.3%)	20 (66.7%)
6. I thought there was too much inconsistency in this system.	17 (56.7%)	3 (10%)	2 (6.7%)	6 (20%)	2 (6.7%)
7. I would imagine that most people would learn to use this system very quickly.	0 (0%)	0 (0%)	1 (3.3%)	9 (30%)	20 (66.7%)
8. I found the system very cumbersome(difficult) to use.	15 (50%)	8 (26.7%)	0 (0%)	6 (20%)	1 (3.3%)
9. I felt very confident using the system.	0 (0%)	1 (3.3%)	1 (3.3%)	10 (33.3%)	18 (60%)
10. I needed to learn a lot of things before I could get going with this system.	13 (43.3%)	3 (10%)	1 (3.3%)	8 (26.7%)	5 (16.7%)

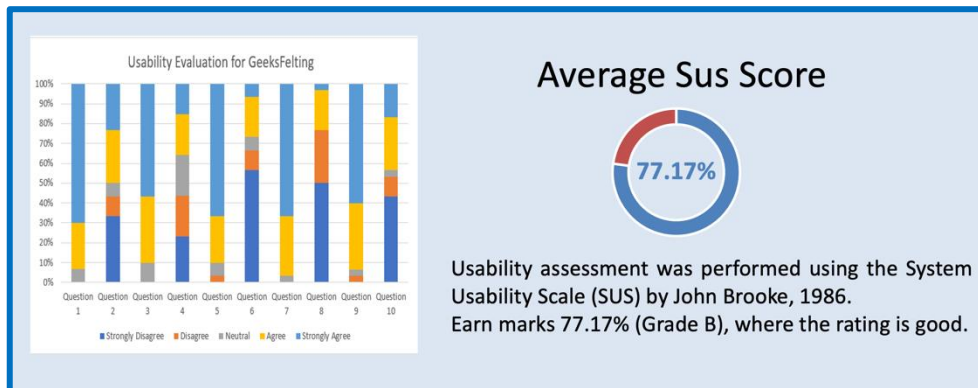


Figure 5: Bar graph of usability evaluation for GeeksFelting web-based development

DISCUSSION

According to the SUS Final Score analysis, GeeksFelting Web-Based Learning is 77. Based on Figure 4: SUS Score Guidance, it is reasonable to conclude that the usability of GeeksFelting Web-Based Learning is good. It has good consistency with all the buttons that may be clicked, the web application is responsive either on a smartphone or desktop, and the interface design that made a favorable impression on the user. However, GeeksFelting Web-Based Learning still has room for growth to meet users' upcoming requirements in the future.

CONCLUSION

This paper provides comprehensive research concluding remarks for developing the Geeks Felting Web-Based Learning System. GeeksFelting is appropriate to be a market for the self-taught crafter. Moreover, the system provides on-demand tutorials ranging from beginner to advanced levels. GeeksFelting can be used by anyone new to the needle felting craft to learn the basic to advanced levels. The use of video in learning will make the learning proves more engaging to users.

This study can be used as a reference for researchers who wanted to produce a better version of this system in the future. Several suggestions for future improvement. First, Geeks Felting Web-Based Learning educational content should include translation for multiple languages in each video section. The translation is necessary to assist users who do not understand English or follow the video presentation. Moreover, the video content also needs to use native English speakers to avoid mispronouncing a particular word, affecting the users' concentration. Second, Geeks Felting Web-Based Learning should implement gamification. Gamified elements develop a sense of accomplishment, which encourages users to use the system regularly. The system can implement virtual badges that will reward when the user finishes the educational content. The badge's work gives the user acknowledgment, and it provides the user with more desire to take on the next assignment. Last, Geeks Felting Web-Based Learning should display information on the course progress for learning analytics.

REFERENCES

- Ayoub, A., Amin, R., & Wani, Z. A. (2020). Contribution of developed countries towards MOOCs: an exploration and assessment from a representative platform Coursera. *Asian Association of Open Universities Journal*, 15(2), 251–62. <https://doi.org/10.1108/AAOUJ-03-2020-0016>
- Aryal, S. (2020). *Mern Stack with Modern Web Practices – Developers Connecting Application*. Bachelor Thesis. Turku University of Applied Science.
- Brewer, J. L., & Dittman, K. C. (2018). *Methods of IT project management*. Purdue University Press.
- Cetina, I., Goldbach, D., & Manea, N. (2018). Udemu: a case study in online education and training. *Revista Economică*, 70(3), 46-54.
- Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, 16(2), 45-58. <https://doi.org/10.24191/ajue.v16i2.10294>
- Dinc, E. (2017). Web-based education and accessibility. *International Journal of Technology in Education and Science*, 1(1), 29-35.
- Holden, R. J. (2020, September). A simplified system usability scale (SUS) for cognitively impaired and older adults. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 9, No. 1, pp. 180-182). Sage CA: Los Angeles, CA: SAGE Publications.
- Huotilainen, M., Rankanen, M., Groth, C., Seitamaa-Hakkarainen, P., & Mäkelä, M. (2018). Why our brains love arts and crafts implications of creative practices on psychophysical well-being. *FORM Akademisk*, 11(2), 1-18. <https://doi.org/10.7577/formakademisk.1908>
- Kramer, M. (2018). Best practices in systems development lifecycle: An analyses based on the waterfall model. *Review of Business & Finance Studies*, 9(1), 77-84.
- Marple, S., Jaquet, K., Laudone, A., Sewell, J., & Liepmann, K. (2019). Khan Academy in 7th grade math classes: A case study. *WestEd.org*.
- Micheal, J. (2017). E-Learning and MOOC: The cross currents in education and the benefits for learners. *Journal of Advances and Scholarly Researches in Allied Education*, 13(1), 932-934.
- Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, 8(1), 133-141. <https://doi.org/10.1177/2347631120983481>
- Tenório, M. M., Reinaldo, F. A. F., Góis, L. A., Lopes, R. P., & Santos Junior, G. D. (2017, September). Elements of gamification in virtual learning environments. In *International Conference on Interactive Collaborative Learning* (pp. 86-96). Springer, Cham. https://doi.org/10.1007/978-3-319-73204-6_12