

The BEE Model with Live Virtual Classroom to Enhancing Creative Works

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Abstract

Online learning is recognized as an effective teaching method and tool, widely integrated into different teaching and learning strategies to provide quality education at different levels. However, the field of design education does not have extensive research into online learning, delivery, and assessment. This study developed an online learning model for design disciplines to improve creative work effectively. This paper describes an empirical study to test the BEE model outcomes developed following previous research. This present study has focused on the intensity of the live virtual classroom in every step to compare differences in the scores of creative works. Therefore, the assumption was that Thai undergraduate design students who learned with the BEE model through live classroom learning (experimental group) would have at least one element of the creative work scores compared to the group learning through the traditional online teaching method (control group). Furthermore, we conducted a multistage randomized sample of 66 participants, divided into an experimental group of 33 participants and a control group of 33 subjects. To compare the scores of creative works, the test of creative works assessment rubric was used to collect the data. Then, they were analyzed using the MANOVA statistical test. The results found at least one element of them, and the average creative work scores of the experimental group showed that they were significantly higher than the control group ($p < 0.05$).

Keywords:

Live Virtual Classroom;
Creative Works;
Experiential Learning;
e-Portfolios Learning.

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1- Introduction

The COVID-19 pandemic made a resounding impact worldwide, forcing brick-and-mortar higher education institutions to move online. During this transition, students had to adjust while attempting to construct meaning amidst the myriad of pandemic-related challenges. At the same time, educators had to transition from in-person to online course delivery while navigating their uncertain circumstances [1]. Accordingly, distance learning was a necessity during the COVID-19 pandemic. In a brief period, students and educators transitioned to distance learning. The emergency transition left educators without the tools for engaging students successfully during distance learning lessons [2]. Educators were forced to use experiential learning to determine effective instructional strategies to engage their students while remote. Experiential learning involves focusing on real-world problems and applying knowledge to use needed skills and contributes to improvements in crisis response skills [2-3]. To provide high-quality education during distance learning, school districts and educators need additional research on the most effective instructional strategies determined by educators using experiential learning to engage students online [4]. Additionally, an e-Portfolio can be regarded as a valuable tool to encourage students to reconsider and narrate their learning experiences [5].

Researchers have considered and analyzed different aspects of the distance-learning format of education compared with traditional "face-to-face" delivery. However, many issues related to distance learning remain unanswered and still require significantly further research. Seemingly, the amount of student interaction improves the educational experience

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of distance learners [6]. Australian university (COFA online) argues that the “online experience”, whether shopping, socializing, resourcing, or teaching and learning, is different from when the same face-to-face activities take place [7]. Online learning is recognized as an effective teaching method and tool, widely integrated into various teaching and learning strategies to provide quality education at different levels. However, the field of design education does not have extensive research into online learning, delivery, and assessment [8]. The studio is the heart of the design, making it difficult for design educators to embrace technology-driven changes in online teaching and learning environments. There are very few universities worldwide offering online bachelor’s degrees in design programs. Although a higher overall growth has been observed in online courses, brief evidence and limited research have explored the perspectives of design educators who lament the loss of direct interaction [7]. Experiential learning environments such as computer labs and design studios are essential for learning practical skills such as programming, design, and data science [9].

COVID-19 has turned the world upside down in many ways; its impact on education has been significant across the globe. The shift from in-person to virtual teaching and learning has been particularly disruptive. Instead of co-creating and maintaining learning spaces that foster in-person dialogue, educators and students have had to quickly master the art of teaching and learning in a very different format. An added complexity was the perceived expectation that virtual classes would, for the most part, continue synchronously rather than transitioning to the typical asynchronous format of pre-COVID-19 online learning. This context emphasized the importance of designing and enacting teaching and learning experiences that fostered student engagement through active learning [10]. Thus, a high level of interaction positively affects distance learning courses [11]. Live virtual classroom has another advantage as interactions, which are: learner-content, learner-instructor, and learner-learner in the online environment [7, 8, 12-14]. This type of classroom can add value to teaching and learning models, either as a supplement or replacement for face-to-face [15].

1-1-Live Virtual Classroom

In the 21st century, with globalization and online technological advancement, innovative teaching processes are important for human development. Using creative applications was considered a potential tool for developing higher-order thinking skills and changing the educational process [16]. Virtual learning replaced classroom learning in many cases. In the future, all work will be done in real-time with colleagues worldwide and learn that could create a learning community to form a group for virtual classroom learning [17, 18]. The live virtual classroom was used to explain various online learning environments ranging from asynchronous and synchronous systems. The asynchronous system included interactive learning in the virtual world using a second life with asynchronous interaction through emails, web boards, and other methods [19]. In synchronous systems, the participants could join live virtual meetings using shared whiteboard space, voice-over IP, video streaming, file and desktop sharing, text-based chat, polling, and participant Q&A and feedback capabilities. Learners could communicate directly with teachers while learning or online learning using two-way online communication with an immediate response between learners and teachers (synchronous interaction) such as chat [20]. Traditionally, there was no face-to-face interaction in online learning; however, live virtual meetings are currently used in online learning. The word “live virtual classroom” might be a new concept. However, its basic concept has been discussed in similar contexts for almost a decade, such as live e-learning systems, virtual classrooms, synchronous training systems, live online learning systems, or web conferencing systems [21]. The live virtual classroom consisted of application file sharing, live demonstrations and guided, live audio/video, virtual office hours, student workgroups, guided problem-solving sessions, text chat, quizzing and polling and virtual labs [22]. These components enabled the live virtual classroom to respond in real-time to various forms, such as video conferencing, instant messaging, and web conferencing, which could respond and create a sense of involvement in online and blended curricula [23]. Instructors and students could interact from any place at any time responded to learning from hands-on activities as it relied on discussion, debate, participation in hands-on activities, research, and learning through their preferred methods. It included discussion, expression of opinions, collaboration, design, solving assigned problems, completing exercises, reading, writing, and speaking, which were different from traditional classroom lectures and could be adjusted to be more flexible and convenient for completing different activities. Furthermore, the students could consult closely with their instructors during activities for more effective design learning and teaching, and higher quality design works.

1-2-Creative Works

The value of creative works has resulted from human thought processes. Its production relied on creativity as necessary materials that must be new, have values and accuracy, or work well and have aesthetic value [24, 25]. Creative works refer to any manifestation brought through human effort and involve novelty that can be produced in business, politics, arts, humanities, science, and education [26]. For this article, the focus of creative works was on creative art and design workpieces and explicitly focused on visual communication, i.e., communication through images and messages. This was the most potent form of communication, which could deliver and clarify information and entertain the recipients through images and messages. With modern advanced technology, many companies tried to communicate to their target groups through visual communication (advertising) since effective recognition was needed within the shortest possible

time. Most people have relied on visual communication in the forms of graphic design, signs, films, TV commercials, and so on. Visual communication was the oldest form that evolved through time, highly affected the perception of recipients, and was considered an art form [27]. Since visual sensation was one of the most important senses, incidents, objects, and situations in the environment were first seen and then understood. Information received through visual sensation was remembered more clearly than other types of sensory. Therefore, it could be said that seeing came before speaking [28]. A visual language was usually presented with clear, eye-catching, and informative graphic design principles in this form of communication, which was an extraordinary method to communicate ideas and emotions [29]. As a result, visual communication could transmit broader and deeper facts and ideas compared to other communicative tools [30]. It was also a part of contemporary design which determined the communication of information at present by relying on the eyes to see and the brain to understand all received information [31].

The components of assessing the creative works were as follows [32-38]:

- **Analysis:** the identification of relationship, organization of information for synthesis, and fundamental analysis or analysis to find the solution to problems based on logic and interpretation.
- **Creative process:** brainstorming for unique concepts to solve a problem. This creative concept or conceptual thinking led to newness from a group or general method, or newness as being newly created because it was original or surprising.
- **Design:** using design principles, organic component arrangement, or artistic components and principles in visual communication. The designed work was valuable for the designers and others, and useful in bringing about resolution and understanding.
- **Craft and technique:** the presentation of work skills regarding craftsmanship, expertise, elegance, and complexity in selecting appropriate tools and techniques.
- **Presentation:** the ability to write and present the creative works and propose issues supporting the unique designed work.

1-3-Blended Experiential Learning with e-Portfolios Learning (BEE Model)

Experiential learning is becoming an integral part of higher education in North America, Europe, and Australia [39]. It effectively improves the entrepreneurial competency of learners, reflecting the expansion of the positive impact of experience-based learning [40].

Experience learning could develop some skills, abilities, attitudes, and personal characteristics such as imagination, innovation, and creativity [41]. It was the most important thing for living skills as everything happened from actions resulting from experience [42]. The experiential learning principle was supported by past experience or reflection of experience starting from real encounters or new experiences, the quest for the solution to exciting problems, records of happenings and their analysis, and critical review of new knowledge or experience [43].

Kolb's learning from experience theory proposed theoretical and practical working frameworks for analyzing different experiences and changing the experience to new practice guidelines then tested to create one's own experience. There were four steps as follows [44-48]:

- **Concrete Experience (CE):** the beginning of a learning cycle was exposure to experience.
- **Contemplative Observation (RO):** learners contemplated and observed all experiences, including some from the situations and feelings related to the situations. So that the learners saw the relationship between what they knew and did not know and freely developed their ideas.
- **Abstract Conceptualization (AC):** understanding experience and concept specification by interpreting the concept from experience.
- **Active Experimentation (AE):** focus on new perceptions of changing experiences in an actual situation by emphasizing real practice.

Nevertheless, learning through experience would be more successful if the learners collected experience by themselves and learned through that experience to be stored and could be later used to create works. An e-Portfolio could reflect experience and self-growth throughout the path of experiential learning [46]. The concept of a portfolio is essential and necessary for art education and design in most countries [49].

The e-Portfolio provides a method combining functionality and technology, which is a personalized learning tracking with authentic evidence [50-52]. Artists in various fields (i.e., visual arts, sculpture, and fashion) have a long tradition of using the portfolio as a collection to present their work for various purposes [53, 54]. An innovation of the early 1990s was an electronic version of the portfolio; a document (file) is created, published, and presented with the help of a

computer and selected programs. The digital format offers a variety of options, including those related to presentation and content (multimedia text, audio, and video). Further, an e-portfolio often succeeds in illustrating the dynamic and complex teaching process better than on-paper documentation [55]. Besides looking at multiple purposes, one may categorize e-Portfolios in various ways. The e-Portfolios division into three potential forms of a portfolio in D&T (Design and Technology) expresses the developmental dimensions of the e-Portfolios: the simplest one is like a container of experiences; the second dimension is more a learner report, and a story of personal development and the richest dimension of e-Portfolios represent more a dialog; providing external support for the internal conversation of learners throughout their working process [56].

Assessment of creative works could be conducted in many ways. However, the primary methods were assessing practice by experts and rubrics. In addition, assessment of learners' progress through observation, interview, conversation, checklist, questionnaire, test, essay, visual specification, attitude test, and portfolio [57]. To assess learners by considering the process and development of learners, the e-Portfolio was the channel used for learners and educators to promote learning and knowledge, which could be considered a "Project of learn- as-you-go" [58]. Additionally, e-Portfolio Learning is a replica of industrial design processes and real work experience where criticism, collaboration, and feedback are always prevalent [59]. Developing planning, creativity, critical thinking, and problem-solving skills through e-portfolios could help students become critical thinkers [60].

The e-Portfolio learning steps have been developed from a student-centered Plan-Do-Review cycle, focused on developing the ability of learners to criticize and learn to take responsibility for their learning [16]. The steps were as follows:

- Plan and understand what you will do.
- Collect artifacts.
- Select and link.
- Examine and reflect on artifacts.
- Share and present your invention.

The e-Portfolio learning could also help promote self-learning through one's own experience from collected creative works. Learners presented their learning patterns and personality through online collections of works [61].

Throughout the development process until the BEE model, blended experiential learning with the e-Portfolios learning method consisted of four steps: experience, reflect, conclude, and apply. The last step comprised six detailed steps; plan, collect, select, reflect, share, and assess.

2- Method

We continue to develop the BEE model based on previous research, adding a live virtual classroom approach developed at every step from the literature review. The format was assessed and approved by experts. The test was run in the trial run from the sample group of the study population of undergraduate design students from nine government-supervised universities in Bangkok and peripheral areas. The participants selected using the multistage sampling method were used [62]. The sample group consisted of 66 first-year students, the trial run conducted with the sample group of 33 participants (learning by following the format) and the control group of 33 participants (learning by not following the format). The creative works were assessed using the assessment criteria developed by content analysis and their details were in the form of rubrics. It was developed from the literature review, and the rates of congruence were evaluated by five experts who were teaching specialists. In the assessment of creative works, the reliability of creative works assessors (or instructors) was analyzed. The stability measurement was a test-retest method using similar instruments to test the same group of informants twice at different times. The data were then calculated for the Pearson product-moment correlation coefficient [63]. MANOVA was then used to test whether at least one component of creative works test scores of the experimental group were higher than the control group. Also, a T-Test was used to test whether the average creative works scores of the experimental group after learning were higher than those of the control group.

2-1- The BEE Model with Live Virtual Classroom

The BEE model: Blended experiential learning with e-Portfolios learning method consisted of four steps, including experience, reflect, conclude, and apply. The last step comprised six detailed steps; 1) plan, 2) collect, 3) select, 4) reflect, 5) share, and 6) assess, and with live virtual classroom, which consisted of 1) application sharing (File Sharing, Shared Whiteboard) 2) live virtual meetings (and Privet Live Virtual Meetings), and 3) two-way communication (Chat, Web-board, Q&A and feedback).

Steps of learning management of the BEE model through live virtual classroom consisted of the following components in Table 1.

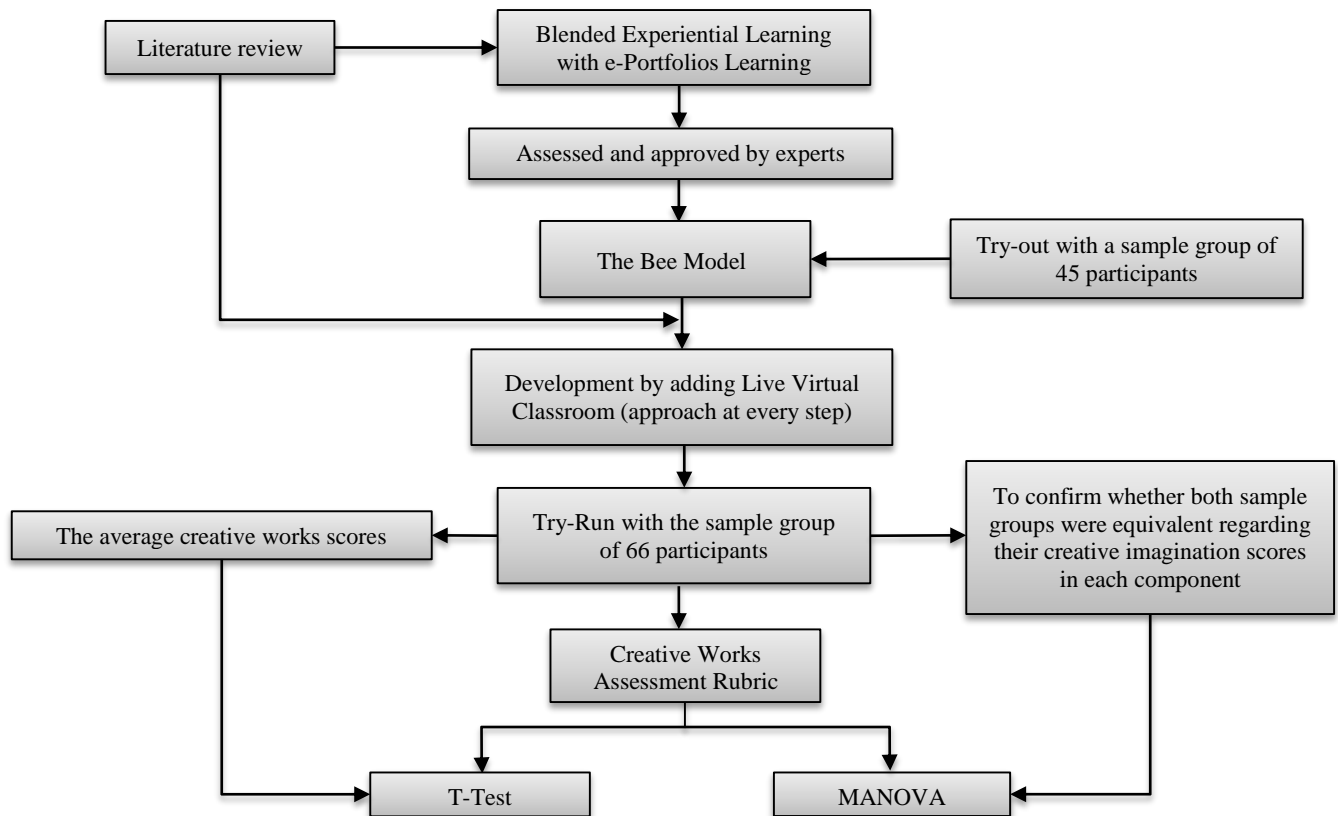


Figure 1. The flowchart to show the research methodology

Table 1. The BEE model with live virtual classroom activities in each step

| Week | Learning Process | Learning activities | Live Virtual Classroom |
|------|------------------|---|--|
| 1-5 | 1. Experience | Creation of experience through activities by learning from the experience of others through examples of Creative Works or lectures | Live Virtual Meetings Application File Sharing Shared Whiteboard Q&A and feedback Web- board |
| 1-5 | 2. Reflective | Instructors reflect their experience by writing (typing messages) reflecting learning experience in a weekly e-Portfolio | Web- board Two-way Communication Q&A and feedback |
| 1-5 | 3. Conclude | Learners conclude ideas learned through experience by typing concluding messages as knowledge from a reflection in weekly e-Portfolio | Web- board Q&A and feedback |
| 1-5 | 4. Apply | Learners apply what they learn from experience by creating design works from knowledge from experience and collecting design works in the form of the e-Portfolio. All four steps are learned every week for five weeks and followed by the next step in week | Web- board Q&A and feedback |
| 6 | 4.1. Plan | Learners specify scope of interest and understanding of processes and methods to carry out a Creative Works by writing a plan as a starting point to gather information in the next step | Live Virtual Meetings Application File Sharing Shared Whiteboard Q&A and feedback |
| | 4.2. Collect | Learners collect information related to their Creative Works, examples, and sources of ideas by gathering all information related to designing assigned works. And collecting design works in the form of the e-Portfolio. | Chat Web- board Privet Live Virtual Meetings Two-way Communication Q&A and feedback |
| 7 | 4.3. Select | Learners select concept and what to be used to effectively communicate about the concept by presenting concepts selected from the gathered information. And collecting design works in the form of the e-Portfolio. | Live Virtual Meetings Web- board Q&A and feedback |
| 8 | 4.4. Reflect | Learners could reflect ideas and what to communicate through Creative Works and could reflect ideas towards others' works by communicating concepts through Creative Works and focusing on gaining more experience. | Chat Privet Live Virtual Meetings Q&A and feedback |
| | 4.5. Share | Learners present and share their Creative Works and use comments to improve their works by presenting their works through writing and speaking by connecting ideas to created works and presenting works in e-Portfolios. | Live Virtual Meetings Shared Whiteboard Application File Sharing Q&A and feedback |
| 9 | 4.6. Assessment | Instructors assess Creative Works by assessing works in portfolios using a Creative Works assessment form. | Web- board |

2-2- Experiment and Data Collection

The steps of the experiment were:

- The experimental group was taught using the experiential learning method with e-Portfolio learning through a live virtual classroom for nine weeks, four hours per week. There was only a small amount of lecture time. Experiential learning activities were emphasized through the weekly assignment. Steps 1-5 were repeated for 5 weeks (Experiential learning was repeated five times). In week 5, learners learned through their work from experience collected in the e-Portfolio. Next, in the e-Portfolios learning steps, weeks 6-8 focused on learning through close interaction between instructors and students for idea development in steps 4.1-4.5.
- The control group studied similar lessons to the experimental group with the same duration but a minimum lecture similar to the experimental group through the traditional teaching method. The focus was on assigning the problems (similar problems as the experimental group) and leading the learners to create design works through the traditional online system with no live virtual classroom (was not used in the BEE model, for example, no chat privet, no live virtual meetings, and no e-Portfolio). While the control group submitted their work through the regular online system, which was not stored in the e-Portfolio system, the experimental group submitted every work in their e-Portfolios.
- After studying all the lessons by the two groups and completing all the activities in week 8, the design work was assigned for week 9. Then, the design work was assessed using specified criteria.
- The scores were calculated using MANOVA statistical.

2-3- Creative Works Assessment

Visual Communication & Digital Media Arts Portfolio Review assessment criteria were used (Bowie State University, 2011-2015) (See Table 2).

Table 2. Creative works assessment rubric

| Assessment | Assessment criteria | Rating criteria | | | |
|-------------------|--|-------------------------------------|--|---|----------------------------|
| | | 4Excellent | 3Good | 2Acceptable | 1Poor |
| Analysis | Specify problem-solving objectives | Clear and outstanding | Clear but not outstanding | Some | Little |
| | Brainstorm to answer a question | Plenty and various | Some parts | Brainstorm to answer a question | Plenty and various |
| | Specific relationship and organize information | Consistent | Little | No | No |
| | Research and review related examples | Numerous | No | No | No |
| Creative | Show understanding of selection of ideas to solve a problem | Deep understanding | Good understanding | Some | Little |
| | Development of ideas | Plenty | Some | Little | No |
| | Concept | Uniquely outstanding | General | Just theme | Not appear |
| | Design concept | Concept could be designed variously | Concept could be designed to some extent | Concept could be designed to small extent | Concept cannot be designed |
| Design | Selection of basic design components and art principles | Excellent and appropriate | Good | Some | Little |
| | Ability to communicate ideas as desired | Excellent | Some | Little | No communication |
| | Ability to design to meet the objectives | Excellent match | Partly match | Match a little | Not match |
| | Imagination in composition | Unique and outstanding form | General form | No use of imagination | No use of imagination |
| Craft & Technical | Ability to use techniques | Expert | Able | Some | Little |
| | Attention to details | A lot | Some | Little | No |
| | Different techniques used are appropriate for concept and designed work for presentation | Very appropriate | Little | Not appropriate | Not appropriate |
| | Research for additional techniques | Research a lot | Little | No | No |
| Presentation | Oral or written presentation | Organized with complete details | Organized | Partly | Little |
| | Speak or write to present and explain reasons | Related to what is used | Some parts | Little | Not appropriate |
| | Oral or written presentation | Match with the designed work | Little | Not appropriate | Not appropriate |
| | Selection of presentation method | Appropriate | Not appropriate | Not appropriate | Not appropriate |

3- Results

3-1-Assessment of Creative Works of the Experimental and Control Groups were Collected

Table 3 shows that the Wilks' Lambda statistic had a sig.=0.000, which was less than α (0.05), and the values of Hotelling's trace and Roy's largest root were equal (or nearly identical) to 66.310. The group which studied through the BEE model through the live virtual classroom (experimental group), in at least one component of creative scores, showed significantly higher scores than the group which studied through a traditional method ($p < 0.05$). Therefore, the creative works component scores between the two groups were compared in the next step.

Table 3. Mean values from multivariate tests

| Effect | | Value | F | Hypothesis df | Error df | Sig. |
|-----------|--------------------|--------|----------------------|---------------|----------|-------|
| Intercept | Pillai's Trace | 0.985 | 795.717 ^b | 5.000 | 60.000 | 0.000 |
| | Wilks' Lambda | 0.015 | 795.717 ^b | 5.000 | 60.000 | 0.000 |
| | Hotelling's Trace | 66.310 | 795.717 ^b | 5.000 | 60.000 | 0.000 |
| | Roy's Largest Root | 66.310 | 795.717 ^b | 5.000 | 60.000 | 0.000 |
| Group | Pillai's Trace | 0.792 | 45.668 ^b | 5.000 | 60.000 | 0.000 |
| | Wilks' Lambda | 0.208 | 45.668 ^b | 5.000 | 60.000 | 0.000 |
| | Hotelling's Trace | 3.806 | 45.668 ^b | 5.000 | 60.000 | 0.000 |
| | Roy's Largest Root | 3.806 | 45.668 ^b | 5.000 | 60.000 | 0.000 |

a. Design: Intercept + group, b. Exact statistic

Table 4 shows that the average scores of all five components of the creative work of the group which studied with the BEE model through the live virtual classroom were significantly higher than the group with the traditional method ($p < 0.05$). It is assumed that groups learning through the BEE model with the live virtual classroom (experimental group) had higher scores on all components of creative works. The experimental group found that the average creative score in the analytical component was the highest ($\bar{x} = 3.73$), and in the presentation component ($\bar{x} = 3.70$), the experimental group had the highest average creative score than the control group ($\bar{x} = 2.06$). the experimental group had a higher mean score on the handicraft and technique component ($\bar{x} = 3.33$) ($t = 14.835$) than the latter in the control group ($\bar{x} = 2.18$) ($t = 7.305$), and the experimental group had a mean score on creativity ($\bar{x} = 3.58$) that increased higher than the control group ($\bar{x} = 2.42$) subsequently ($t = 6.818$).

Table 4. Results of the MANOVA analysis of five components of creative works between the experimental and control groups

| Dependent variable | Group | Mean | Std. | t | Sig. |
|--------------------|------------|------|-------|--------|-------|
| Analysis | Control | 2.82 | 0.683 | 6.378 | 0.000 |
| | Experiment | 3.73 | 0.452 | | |
| Creative | Control | 2.42 | 0.663 | 6.818 | 0.000 |
| | Experiment | 3.58 | 0.708 | | |
| Design | Control | 1.97 | 0.728 | 5.498 | 0.000 |
| | Experiment | 2.94 | 0.704 | | |
| Craft & Technical | Control | 2.18 | 0.465 | 7.305 | 0.000 |
| | Experiment | 3.33 | 0.777 | | |
| Presentation | Control | 2.06 | 0.242 | 14.835 | |
| | Experiment | 3.70 | 0.585 | | |

Table 5 shows the results of the t-test of the groups learned according to the model. The average score for creative works was 17.27, higher than those groups that did not learn according to the model ($\bar{x} = 11.45$) and confirmed the statistically significant hypothesis ($p < 0.05$).

Table 5. Results of the T-Test analysis of creative works between the experimental and control groups

| Dependent variable | Levene's Test | | Group | Mean \bar{x} | Std. | t | Sig. (2-tailed) |
|--------------------|---------------|-------|------------|----------------|-------|-------|--------------------|
| | F | Sig. | | | | | |
| Creative Works | 1.383 | 0.244 | Control | 11.45 | 2.209 | 9.873 | 0.000 |
| | | | Experiment | 17.27 | 2.565 | | |

3-2- Creative Works Images

Learners who learned through the steps of the BEE model through the live virtual classroom were taught to research related design knowledge. Different techniques were studied to appropriate methods for them and enable them to communicate about their work. Through observation and recording results, students learn how to find ideas from experience and summarize them into knowledge that can be applied to design work, enabling them to develop creative works effectively. These results can present ideas able to communicate through works and knows how to speak better or write to describe creative works. Because of the BEE model, learners must practice writing summaries and reflect on two steps. According to the BEE model, the group students can quickly learn and understand the process and realize that the skilled group will use live virtual lessons to interact with teachers who are more than the middle and weak groups, respectively.

In addition, some learners could effectively learn through this method at a moderate level beginning of their work (Figure 2). Then, they learned from their experience and tried to create other forms of experience to improve their craft and technical and design skills. Some learners learned well using the format but still needed time for understanding, and, in the end, they could develop their creative works. Trial and error were still necessary to develop creative works while the lack of prior knowledge application was still evidenced.

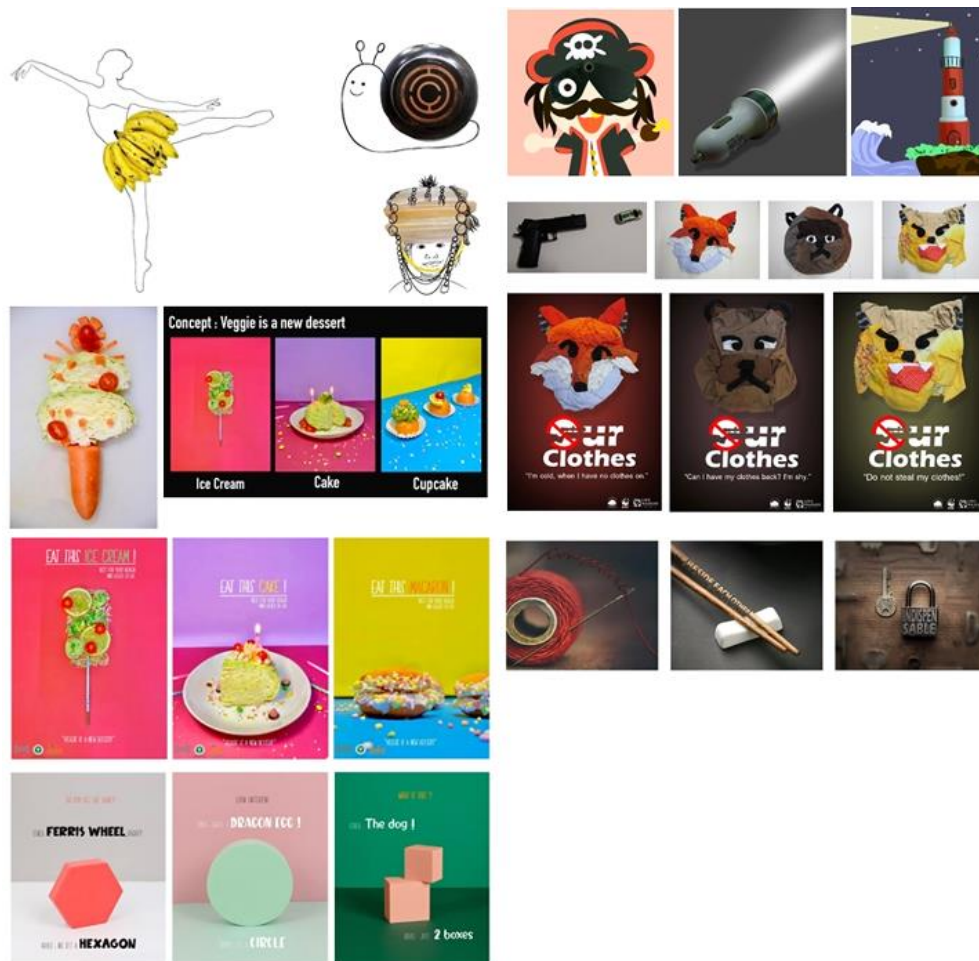


Figure 2. Examples of some creative works of student from the weak group form 2 people

Some learners could effectively learn through this system (Figure 3). There was evidence of knowledge application process and learning through their past works to apply that knowledge to their future work. It shows that learners learn and are well versed in the BEE model process, so they can summarize and apply it in future work.

Some learners could learn well through the process, and most of them were in moderate to strong groups and exceptionally diligent (Figure 4). This group had a positive attitude towards accepting various learning methods and was willing to learn and work through the process, especially where experience and experience collection was necessary for learning. This group of learners researched and studied with openness to different experiences, and it could be observed that their development grew rapidly. They enjoyed creating every work and continuously tried to develop their works. They also applied such knowledge to other subjects by creating their e-Portfolio according to what was suggested by the instructors. It shows that learners have a profound level of understanding and applying the BEE model.



Figure 3. Examples of some creative works of student of the strong group



Figure 4. Examples of creative works of the student from the moderate to the strong group

4- Discussion

The BEE model is the blended Experiential Learning with the e-Portfolios learning method. Learning through this method promoted experiential learning and learning from the collection of experiences. Experiential learning using the online system allowed learners to research by themselves and collect what they have learned in e-Portfolio formats. The learners knew what they were learning and doing, and they could also always learn, which led to the development of the designed work quickly [64]. Experiential and hands-on learning was learning the methods which helped develop and promote the creativity of learners [65]. Knowledge gained from experience was also recorded as parts of their memories that could not be deleted [66].

The changing experience was at the heart of the experiential learning and reflection process and an essential step in integrating new and prior experiences [44, 67, 68]. Experienced learning was an effective analysis tool for developing a concept [44]. The e-Portfolio could show creative works or processes as its function was to collect the creative works so that the progress of students could be systematically tracked with consideration [69]. Then, experiential learning was a valuable foundation for learning and teaching, focusing on creating innovation [65].

The e-Portfolio can be regarded as a valuable tool to encourage students to reconsider and narrate their learning experiences by engaging in that reiterative process of looking back to the previous performance, looking forward to goals, and reflecting on their learning. The reflection is a process to support the growth of learners and form through feedback from peers and facilitators. However, the awareness makes them skillful or recognized as reflective practitioners. In this study, reflection, apart from authentic assessment, is focused on learner analytical, project-based, problem-based, and critical thinking skills that encourage a constructivist approach to learning, where students learn through application. These skills help learners raise self-reflection, stimulate creativity, improve active learning, and improve peer communication and student-facilitator interactions [70].

We found that learning through the BEE model through the live virtual classroom showed higher average scores of creative works than the traditional learning method in every component. The average score for analysis was the highest because learners went through collecting data and selecting the best part for design concept development. The average presentation score was ranked second and the highest compared to the group of online traditional learning methods. The learners went through reflection processes two times together with sharing. Therefore, they understood presentation order, reflection, and the importance of presentation in conceptualizing and developing a designed work and ideas [71]. The second-highest average score was creative compared to the group that learned through the traditional method, followed by craft, technical, and design. It could be concluded that a combination of complementary teaching methods and the use of appropriate educational technology resulted in a higher level of creative works development. This study could be a guideline for those interested in improving creative works for better results. The shared experience helped the learner support each other in finding ideas for their craft products and designing them. It can also help the teacher guide the process of designing by helping the learner connect with the task at hand.

It is important to have research-based information on the activities of learners while performing holistic craft tasks to identify the methods and approaches that offer the learner an appropriate amount of freedom and set of limitations. However, even many learners showed that they could use different experiences and tasks to support the process and benefit from the materials and experiences passed on in the design stage of a craft process [72]. The experiential learning cycle has been applied to the layout and graphics design in computer courses provided by the communication and media studies faculty to the students studying in the public relations and advertising department. It is hoped that by applying the experiential learning cycle, the creativity and problem-solving strategies of the students will be further improved [73]. Imagination, innovation, and creativity can be developed through experiential learning, stressing that creative thinking and problem-solving can be best taught with experiential learning activities [74]. Also, experiential learning can be used to improve communication skills, indicating improvement in presentation skills [75]. In a selected private higher learning institution, students use e-portfolios to enhance the learning experience, scholarly communication, sharing of ideas, collaboration, flexibility, critical reflection on their work, and identifying strengths [76]. Additionally, the e-portfolio is a powerful tool to develop students' communication and critical thinking skills, allows students to produce their own reflective written products, and fosters active learning [77].

The experimental group that highly interacted with the instructors could develop their creative works faster from the observation. The instructors emphasized stimulating further experiential learning because a live virtual classroom was an organization of the online learning environment to replicate a real classroom virtually [78]. However, it has advantages in terms of learner-instructor and learner-learner interactions in the online environment [7, 8, 13, 79]. The high level of interaction was beneficial to distance learning because it affected the success of the online curriculum [11, 80, 81]. It might be said that the live virtual classroom affected the performance of learners in distance learning more than regular online learning [82], and the advantages were also in the presentation of speakers, 3D objects, and movements. Moreover, two-way interaction between the instructors and students was possible [83]. It was also found that the experimental group could develop more creative works in each component as they studied different related experiences and learned to apply that experience to creativity using the BEE model through live virtual classroom learning steps. Studying the characteristics of learning experience through the e-Portfolio could promote the analysis ability among distance online students, which caused to enable the components of creative works to be developed systematically in terms of analysis and creativity.

Those learning with e-Portfolio files could also improve the development of analytical skills [84]. Creativity and learning were components derived from human experience, underlining the dynamic relationship between learning and creativity. Because when creating or compiling new things, relying on new experiences or learning is needed [85]. It was also found that creativity was derived from combining old thinking or changing of one's ideas which could be called creative experience. Therefore, it could be said that experience was an important mechanism of creativity [86]. Experiential learning and collection of works in the form of the e-Portfolio could help learners to develop communication skills through images and various techniques. These included their expertise, strengths, weaknesses, findings of appropriate techniques, and attempts to learn unfamiliar but suitable techniques so that design and techniques could be developed together. In the reflection step of experiential learning and e-Portfolio learning, learners had an opportunity to practice concluding their ideas in writing or presenting; consequently, presentation skills components were developed. All of these led to higher creative works assessment scores of the experimental group than those of the control group in every component.

5- Conclusion

The BEE model: Experience, reflect, conclude, and apply were the four steps of blended experiential learning with the e-Portfolios learning method. Above-mentioned the last step, apply, has comprised six detailed steps, plan, collect, select, reflect, share, and assess. Additionally, blended experiential learning with a live virtual classroom consisted of application sharing, live virtual meetings, and two-way communication. The findings assumed that Year 1 design students who learned through the BEE model with the virtual classroom had significantly higher scores on creativity

($p < 0.05$) compared to the group learning by not following the format. Based on the results, creative works were enhanced in those studying the BEE model in the live virtual classroom. Hence, the learners who had received such learning methods could develop creative works better than those who did not learn through this method. The average creative works score of the experimental group ($\bar{x} = 17.27$) was higher than that of the control group ($\bar{x} = 11.45$) after learning, confirming the hypothesis.

However, with time constraints, the mean scores for creative assessments in the BEE model group were higher than those in the other groups. Although the time is short, studying with the BEE model in a live virtual classroom is still powerful enough to boost creative works score, according to the premise. It shows that studies of design students who learn in such a way can develop significant creative output within a limited amount of time. In addition, the BEE model enhances the missing part of learning in non-conflicting situations. Future research should explore and develop technology to make teaching with the BEE model more effective, for example, by introducing chatbots to facilitate coaching. Alternatively, creating a specific form of the e-Portfolio platform may be modified or extended at certain stages, such as reflecting or concluding an idea, finding ways to maintain knowledge, and applying it to other subjects. Additionally, there may be a need to find tools to increase discipline in participating in the model in terms of using the live virtual classroom in each step, such as scheduling attendance and creating precise interactions.

6- Declarations

6-1-Author Contributions

Conceptualization, N.S.; methodology, N.S.; software, N.S.; validation, N.S., C.V. and S.T.; formal analysis, N.S.; investigation, N.S.; resources, N.S.; data curation, N.S.; writing—original draft preparation, N.S.; writing—review and editing, N.S.; visualization, N.S.; supervision, C.V. and S.T.; project administration, N.S.; funding acquisition, N.S. All authors have read and agreed to the published version of the manuscript.

6-2-Data Availability Statement

The data presented in this study are available in insert article.

6-3-Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

6-4-Informed Consent

Not Applicable.

6-5-Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

7- References

- [1] Christian, D. D., McCarty, D. L., & Brown, C. L. (2021). Experiential Education during the COVID-19 Pandemic: A Reflective Process. *Journal of Constructivist Psychology*, 34(3), 264–277. doi:10.1080/10720537.2020.1813666.
- [2] Ali, W. (2020). Online and Remote Learning in Higher Education Institutes: A Necessity in light of COVID-19 Pandemic. *Higher Education Studies*, 10(3), 16. doi:10.5539/hes.v10n3p16.
- [3] Danko, T. (2019). Student Perceptions in Homeland Security and Emergency Management Education: Experiential Learning Survey. *Journal of Experiential Education*, 42(4), 417–427. doi:10.1177/1053825919873678.
- [4] Frank, J. (2021). Effective Instructional Strategies, While Using Experiential Learning, to Encourage Student Engagement in a Rural, Distance Learning Setting. Master Thesis, Leadership Education: Sport Management, Winona State University, Winona, United States
- [5] Mohamad, S. N. A., Embi, M. A., & Nordin, N. M. (2016). E-portfolio reflective learning strategies to enhance research skills, analytical ability, creativity and problem-solving. *Asian Social Science*, 12(10), 228–236. doi:10.5539/ass.v12n10p228.
- [6] Bouhnik, D., & Marcus, T. (2006). Interaction in distance-learning courses. *Journal of the American Society for Information Science and Technology*, 57(3), 299–305. doi:10.1002/asi.20277.
- [7] Miltiadou, M., & Savenye, W. C. (2003). Applying social cognitive constructs of motivation to enhance student success in online distance education. *AACE Review (formerly AACE Journal)*, 11(1), 78-95.

- [8] Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, 3(2), 1–7. doi:10.1080/08923648909526659.
- [9] Markel, J. M., & Guo, P. J. (2020). Designing the Future of Experiential Learning Environments for a Post-COVID World: A Preliminary Case Study. Symposium on the New Future of Work (NFW '20), August 3-5, 2020, Virtual Event.
- [10] Sharoff, L. (2019). Creative and innovative online teaching strategies: Facilitation for active participation. *Journal of Educators Online*, 16(2). doi:10.9743/jeo.2019.16.2.9.
- [11] Keegan, D. (1988). Problems in Defining the Field of Distance Education. *American Journal of Distance Education*, 2(2), 4–11. doi:10.1080/08923648809526619.
- [12] Tsui, A., & Ki, W. W. (1996). An analysis of conference interactions on telenex - A computer network for ESL teachers. *Educational Technology Research and Development*, 44(4), 23–44. doi:10.1007/BF02299819.
- [13] Hillman, D. C. A., Willis, D. J., & Gunawardena, C. N. (1994). Learner-Interface Interaction in Distance Education: An Extension of Contemporary Models and Strategies for Practitioners. *American Journal of Distance Education*, 8(2), 30–42. doi:10.1080/08923649409526853.
- [14] Riel, M., & Linda, H. (1994). Research perspectives on network learning. *Machine-Mediated Learning*, 4(2–3), 91–113.
- [15] Schullo, S., Hilbelink, A., Venable, M., & Barron, A. E. (2007). Selecting a virtual classroom system: Elluminate live vs. Macromedia breeze (Adobe Acrobat Connect Professional). *MERLOT Journal of Online Learning and Teaching*, 3(4), 331-345.
- [16] Khoo, L. M. S., Maor, D., & Schibeci, R. (2011). The engineering eportfolio: Enhancing communication, critical thinking and problem solving and team work skills?. *World Academy of Science, Engineering and Technology*, 77, 1027-1032.
- [17] Catherine, N. (2019). The History of Blended Learning-VTT. The Virtual Training Team. Available online: <https://www.thevirtualtrainingteam.com/blog/the-history-of-blended-Learning> (accessed on March 2022).
- [18] Cova, M. (2010). Virtual portfolios in blended learning: Assessment and collaboration. *MEXTESOL Journal*, 34(2), 25-31.
- [19] Masters, Y., & Gregory, S. (2010). Second Life: Harnessing virtual world technology to enhance student engagement and learning. In *Rethinking learning in your discipline. Proceedings of the University Learning and Teaching Futures Colloquium*.
- [20] Falloon, G. (2012). Inside the Virtual Classroom: Student Perspectives on Affordances and Limitations. *Journal of Open, Flexible and Distance Education*, 16(1), 108–126.
- [21] Alahmari, M., Issa, T., Issa, T., & Nau, S. Z. (2019). Faculty awareness of the economic and environmental benefits of augmented reality for sustainability in Saudi Arabian universities. *Journal of Cleaner Production*, 226, 259–269. doi:10.1016/j.jclepro.2019.04.090
- [22] Gunawardena, K. S. L., Hewagamage, C., & Hewagamage, K. P. (2008). Development of a Live Virtual Classroom Environment for Blended Learning. *International Information Technology Conference (IITC)*, January 2008, Colombo, Sri Lanka.
- [23] Parker, M. A., & Martin, F. (2010). Using virtual classrooms: Student perceptions of features and characteristics in an online and a blended course. *MERLOT Journal of Online Learning and Teaching*, 6(1), 135-147.
- [24] Howkins, J. (2002). *The creative economy: How people make money from ideas*. Penguin UK, London, United Kingdom.
- [25] Good, T. L., & Brophy, J. E. (1990). *Educational psychology: A realistic approach* (4th Ed.). Longman/Addison Wesley Longman, Boston, United States.
- [26] Schmoelz, A. (2019). Creative Works. *The International Encyclopedia of Media Literacy*, 1–8. doi:10.1002/9781118978238.ieml0040.
- [27] Ijaz, N. (2018). Art of visual communication, evolution and its impact. *Indian Journal of Public Health Research and Development*, 9(12), 1725–1728. doi:10.5958/0976-5506.2018.02238.6.
- [28] Han, B. (2014). Visual Effects of Advertisements. Master Thesis, Department of Graphic Design, Institute of Social Sciences , Istanbul Arel University, Istanbul, Turkey.
- [29] Malamed, C. (2009). *Visual language for designers: Principles for creating graphics that people understand*. Rockport Publishers, Massachusetts, United States.
- [30] Kepes, G. (1944). *Language of Vision*. Dover Publication, Mineola, United States.
- [31] Lester, P. M. (2013). *Visual communication: Images with messages*. Cengage Learning, Boston, United States.
- [32] Besemer, S. P., & Treffinger, D. J. (1981). Analysis of Creative Products: Review and Synthesis. *The Journal of Creative Behavior*, 15(3), 158–178. doi:10.1002/j.2162-6057.1981.tb00287.x.
- [33] Young, J. G. (1985). What is creativity? *The Journal of Creative Behavior*, 19(2), 77–87. doi:10.1002/j.2162-6057.1985.tb00640.x.

- [34] Bowie State University (2022). Visual communication digital media arts portfolio review rubric (2011-15). Available online: https://bowiestate.edu/academics/colleges/college-of-arts-and-sciences/departments/fine-and-performing-arts/undergraduate-programs/vcdma-major/portfolio_rubric_vcdma.pdf (accessed on April 2022).
- [35] Art Room 104. (2013). Van Gogh Rubric & Essay (More Common Core!). Available online: <http://artroom104.blogspot.com/2013/01/van-gogh-rubric-essay-more-common-core.html> (accessed on May 2022).
- [36] Jacques, L. A., Cian, H., Herro, D. C., & Quigley, C. (2020). The impact of questioning techniques on STEAM instruction. *Action in Teacher Education*, 42(3), 290-308. doi: 10.1080/01626620.2019.1638848.
- [37] The University of North Carolina at Chapel Hill. (2017). Using Rubrics to Assess Students Learning outcomes at the Program Level. Available online: <https://oira.unc.edu/wp-content/uploads/sites/297/2017/07/Developing-and-Using-Rubrics.pdf> (accessed on March 2022).
- [38] Honey, P., & Mumford, A. (1986). *The manual of learning styles*. Peter Honey, Maidenhead, United Kingdom.
- [39] Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. *International journal of lifelong education*, 19(1), 54-72. doi: 10.1080/026013700293458.
- [40] Prastawa, S., Akhyar, M., Gunarhadi, & Suharno. (2020). The Effectiveness of Experiential Learning Based on Creative Industry to Improve Competency of Entrepreneurship of Vocational High School Students. *Proceedings of the 3rd International Conference on Learning Innovation and Quality Education (ICLIQE 2019)*. doi:10.2991/assehr.k.200129.004.
- [41] Meyers, B. G. (1982). Developing creative thinking through experiential learning. *Developments in Business Simulation and Experiential Learning: Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference*, 9, 88-92.
- [42] College of Arts & Media. Digital Design Portfolio Rubric, (2018). Available online: <https://designucd.com/wp-content/uploads/2013/08/Digital-Design-Portfolio-Rubric.pdf> (accessed on April 2022).
- [43] Jaques, D. (1993). *Designing and evaluation courses*. New South Wales: Educational Methods Unit. Oxford Brooke University, Oxford, England.
- [44] Kolb, D. A. (1984). *Experience as the source of learning and development*. Upper Sadle River: Prentice Hall, Upper Saddle River, United States.
- [45] Papai, P., Bourbonnais, F. F., & Chevrier, J. (1999). Transcultural reflection on clinical teaching using an experiential teaching-learning model. *Journal of Continuing Education in Nursing*, 30(6), 260–266. doi:10.3928/0022-0124-19991101-06.
- [46] Holland, B. (2017). The art of reflection. portfolios allow students to regularly reflect on their learning process - deepening their connection to content. *Edutopia: George Lucas Educational Foundation*. Available online: <https://www.edutopia.org/blog/digital-Portfolios-art-of-reflection-beth-holland> (accessed on May 2022).
- [47] Healey, M., & Jenkins, A. (2000). Kolb's experiential learning theory and its application in geography in higher education. *Journal of Geography*, 99(5), 185–195. doi:10.1080/00221340008978967.
- [48] Sellheim, D. O. (2006). Influence of Physical Therapist Faculty Beliefs and Conceptions of Teaching and Learning on Instructional Methodologies. *Journal of Physical Therapy Education*, 20(2), 48–60. doi:10.1097/00001416-200607000-00007.
- [49] Attwell, G., Chrzyszcz, A., Pallister, J., & Hornung-Prähauser, V. (2008). Grab your future with an e-Portfolio. Summary Report: MOSEP – More self-esteem with my e-portfolio. The European Programme for Vocational Education and Training, Poland. Available online: http://www.cel.agh.edu.pl/wp-content/uploads/2009/11/mosep_study.pdf (accessed on April 2022).
- [50] Barrett, H. (2010). Balancing the two faces of ePortfolios. *Educação, Formação & Tecnologias*, 3(1), 6-14.
- [51] Carmean, C., & Christie, A. (2006). ePortfolios. *Handbook of Research on ePortfolios*, 33–43, IGI Global, Publisher of Timely Knowledge, Pennsylvania, United States. doi:10.4018/978-1-59140-890-1.ch004.
- [52] Lorenzo, G., & Ittelson, J. (2005). An overview of e-portfolios. *Educause Learning Initiative, Science and Education. An Open Acces and Academic Publisher, EDUCAUSE*, 1–27. Available online: <https://library.educause.edu/-/media/files/library/2005/1/eli3001-pdf.pdf> (accessed on May 2022).
- [53] Sitthimongkolchai, N., Viriyavejakul, C., & Tuntiwongwanich, S. (2022). Blended Experiential Learning with e-Portfolios Learning to Enhance Creative Imagination. *Emerging Science Journal*, 6, 25-39. doi:10.28991/ESJ-2022-SIED-03.
- [54] Alzouebi, K. (2020). Electronic portfolio development and narrative reflections in higher education: Part and parcel of the culture?. *Education and Information Technologies*, 25(2), 997-1011. doi: 10.1007/s10639-019-09992-2.
- [55] Avraamidou, L., & Zembal-Saul, C. (2006). Exploring the influence of web-based portfolio development on learning to teach elementary science. *AACE Review (formerly AACE Journal)*, 14(2), 178-205.
- [56] Kimbell, R. (2012). The origins and underpinning principles of e-scape. *International Journal of Technology and Design Education*, 22(2), 123–134. doi:10.1007/s10798-011-9197-x.

- [57] Day, M., & Hurwitz, A. (2012). *Children and their art (Art education for elementary and middle schools)*, Wadsworth, Boston, United States.
- [58] Paris, S. G., & Ayres, L. R. (1994). *Becoming reflective students and teachers with portfolios and authentic assessment*. American Psychological Association. doi:, Washington, DC, United States. doi:10.1037/10158-000.
- [59] Keane, Ó. (2014) *E-Portfolios in the Design Curriculum: Enhancing the Practical Dimensions of the Design Studio Class*. Working Paper, DIT Technology enhanced learning, Teaching and assessment, Technological University Dublin, 2014.
- [60] Wang, S. (2007). Roles of students in electronic portfolio development. *International Journal of Technology in Teaching and Learning*, 3(2), 17-28.
- [61] Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Lawrence Erlbaum Associates, Inc, Mahwah, United States.
- [62] Preston, J. (2009). Rescaled bootstrap for stratified multistage sampling. *Survey Methodology*, 35(2), 227–234.
- [63] Best, J.W. & Kahn, J.V. (1998). *Research in Education (8th Edition)*. Pearson, London, United kingdom Available online: <https://www.pearson.com/us/higher-education/program/Best-Research-in-Education-8th-Edition/PGM20531.html> (accessed on May 2022).
- [64] May, D., Terkowsky, C., Haertel, T., & Pleul, C. (2012). Using E-Portfolios to support experiential learning and open the use of tele-operated laboratories for mobile devices. 2012 9th International Conference on Remote Engineering and Virtual Instrumentation (REV). doi:10.1109/rev.2012.6293126.
- [65] Ayob, A., Majid, R. A., Hussain, A., & Mustaffa, M. M. (2012). Creativity enhancement through experiential learning. *Advances in Natural and Applied Sciences*, 6(2), 94–99.
- [66] Costa, T. (2015). Learning through Experience and Teaching Strategies outside the Classroom at Design University Studies. *Procedia - Social and Behavioral Sciences*, 196, 35–40. doi:10.1016/j.sbspro.2015.07.007.
- [67] Sewchuk, D. H. (2005). Experiential learning--a theoretical framework for perioperative education. *AORN Journal*, 81(6), 1311–1316. doi:10.1016/S0001-2092(06)60396-7.
- [68] Richmond, A. S., & Cummings, R. (2005). Implementing Kolb ' s Learning Styles into Online Distance Education. *International Journal of Technology in Teaching and Learning*, 1(1), 45–54.
- [69] Devarajoo, K. (2020). Student and Lecturer Experiences of Eportfolio Assessment for Virtual Classes at a Private University in Malaysia. *International Journal of Social Science and Human Research*, 03(11), 322–330. doi:10.47191/ijsshr/v3-i11-11.
- [70] Mohamad, S. N. A., Embi, M. A., & Nordin, N. M. (2016). E-portfolio reflective learning strategies to enhance research skills, analytical ability, creativity and problem-solving. *Asian Social Science*, 12(10), 228–236. doi:10.5539/ass.v12n10p228.
- [71] Resnick, M. (2007). All I really need to know (about creative thinking) I learned (by studying how children learn) in kindergarten. *Proceedings of the 6th ACM SIGCHI Conference on Creativity & Cognition - C&C'07*. doi:10.1145/1254960.1254961.
- [72] Rönkkö, M. L., & Aerila, J. A. (2015). Children designing a soft toy. An LCE model as an application of the experiential learning during the holistic craft process. *Techné Series A*, 22(1), 44-58.
- [73] Arsoy, A., & Özad, B. E. (2004). The Experiential Learning Cycle In Visual Design. *The Turkish Online journal of Educational Technology*, 3(2), 48-55.
- [74] Leal-Rodriguez, A. L., & Albort-Morant, G. (2019). Promoting innovative experiential learning practices to improve academic performance: Empirical evidence from a Spanish Business School. *Journal of Innovation & Knowledge*, 4(2), 97-103. doi: 10.1016/j.jik.2017.12.001.
- [75] Qurban, M. H., & Austria, R. D. (2009). Improving the communication skills of IS developers during requirements elicitation using experiential learning. *Journal of Information Systems Education*, 20(3), 301.
- [76] Mapundu, M., & Musara, M. (2019). E-Portfolios as a tool to enhance student learning experience and entrepreneurial skills. *South African Journal of Higher Education*, 33, 191–214 1753–5913. doi:10.20853/33-6-2990.
- [77] Mazlan, K. S., Sui, L. K. M., & Jano, Z. (2015). Designing an eportfolio conceptual framework to enhance written communication skills among undergraduate students. *Asian Social Science*, 11(17), 35–47. doi:10.5539/ass.v11n17p35.
- [78] Wang, A.Y. & Newlin, M.H. (2001). Online Lectures: Benefits for the Virtual Classroom. *T.H.E. Journal*, 29(1), 17-18.
- [79] Riel, M., & Harasim, L. (1994). Research perspectives on network learning. *Machine-mediated learning*, 4(2-3), 91-113.
- [80] McBrien, J. L., Jones, P., & Cheng, R. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *International Review of Research in Open and Distance Learning*, 10(3), 1–17. doi:10.19173/irrodl.v10i3.605.

- [81] Page, G.A., Pauli, J., Sturm, C. & Fierstein, M. (2011). Faculty Adoption of Technology: The Use of Elluminate Live. Proceedings of SITE 2011--Society for Information Technology & Teacher Education International Conference, 606-614, Association for the Advancement of Computing in Education (AACE), Nashville, United States.
- [82] Yilmaz, O. (2015). The effects of “live virtual classroom” on students’ achievement and students’ opinions about “live virtual classroom” at distance education. *Turkish Online Journal of Educational Technology*, 14(1), 108–115.
- [83] McIsaac, M. S., & Gunawardena, C. N. (1996). Distance education. *Handbook of research for educational communications and technology*, Simon & Schuster Macmillan, New Yourk,United States..
- [84] Farrell, O. (2019). Developing critical thinking through eportfolio based learning: an exploration of the experiences of non-traditional online distance learners. Ph.D. Thesis, School of Education, Trinity College, University of Dublin, Dublin, Republic of Ireland. doi:10.13140/RG.2.2.11782.22085.
- [85] Selvi, K. (2007). Learning and Creativity. In: Tymieniecka, AT. (eds) *Phenomenology of Life from the Animal Soul to the Human Mind*. *Analecta Husserliana*, vol 93. Springer, Dordrecht, United Kingdom. doi:10.1007/978-1-4020-5192-0_21.
- [86] Nanay, B. (2014). An experiential account of creativity. *The philosophy of creativity: New essays*, 17-35, Oxford University Press. doi:10.1093/acprof:oso/9780199836963.003.0002.