

Blended Learning Online Strategies Into The Product Design Curriculum

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Abstract

This research studied the development of online teaching and learning strategies, and converted to blending learning where staff and students able to access a learning framework that is effective, simple to use. Comparative studies have been conducted in applied arts department, architecture and design college, Jazan University to achieve an approach to how the teaching and learning environment for product design, which normally uses face-to-face. An online educational platform (blackboard) was established, which provided the students with a series of lectures according to the instructional strategies taught. One illustrative case study is presented that outlines how learning strategies were used in planning the product design curriculum. Through identifying and developing, the different design thinking models that is suit particular contexts. And examine of how academics perceive strategies for blended learning and assessing the effectiveness of the educational process and the quality of teaching in product design. A survey of students and analysis of the results were conducted to develop a methodological framework and learning strategies for teaching product design to obtain a creative student capable of solving design problems. It is found that, the quality of online learning currently available in product design curricula is investigating good results. Where online learning trends to supply students with basic knowledge and improves the quality of interactive and collaborative learning assignments. Therefore, blended learning was used for online and face-to-face education.

Keywords: Blended learning BL - staff- strategies -product design– curriculum.

Introduction

As a result of the unexpected shutdown of universities globally as of April 20, 2020 (UNICEF), many staff and students were unable to return to universities. Where many universities have had issues since the breakout of COVID-19 and the subsequent shift to online teaching and learning.(1) The state called for "suspension of lectures and no suspension of faculty," and encouraged faculty to use online and other resources. Education had to react, suspending face-to-face teaching and learning and rapidly adopting online, whereby teaching and learning

are undertaken remotely and on digital platforms.(2) This shift has changed the skills needed by a product designer. Because of this progression, as well as the availability of new technology and digital devices, many approaches and procedures taught in the department program are frequently unchanged from face-to-face methods of product design curriculum. Academics on the design team are challenged to modernize curriculum content and incorporate innovative methods of learning and design work through online education.(3) With the many approaches available in each design phase, design

staff academics confront the difficulty of introducing the vast array of techniques, methodologies, and skills available. (4) Concerns concerning traditional learning methodologies implemented by curriculum management systems create concerns about the quality of students' online curriculum outcome. In this framework, online learning is a new social activity that is increasingly serving as a comprehensive substitute for both online learning and traditional face-to-face lectures.

Online learning is defined as "a coordinated educational strategy in which staff and students are physically separated. (5) Ellis and Allen (2004) note that the term "online" refers to a wide range of applications and activities, including Web-based learning, computer-based learning, virtual lectures, and digital collaboration. It covers content delivery via the Internet. (6) Online learning is rapidly becoming a permanent feature of university education and increasingly important. It provides various advantages, including student self-paced learning; improve personal communication between staffs and students; and increased flexibility in time and place. (7) The rapid use of online learning has offered critical flexibility in education in order to meet the increasing diversity of students. (8)

After using online teaching to digest a portion of the teaching content, less teaching information can be correctly arranged in the limited teaching hours, and the time saved can be used to discuss with students. (9) Therefore, The development of skills through the use of to enhance online learning interactions with curriculum, learning activities and tools, and other students. It presents unique advantages, especially in areas where active learning practices are essential for effective teaching. (10) Students who are unable to attend on-department education due to financial or time constraints now

have an accessible, flexible, low-cost, and location-independent option. In this way, it offers a distinct alternative to standard university education. (11), (12) Online learning encompasses a broader range of services than e-learning; in other words, e-learning institutions are primarily concerned with curriculum content, whereas online education institutions are also concerned with student support. (13) In addition the majority of online curricula include video lectures, formative quizzes, automated evaluation, and/or staff and self-assessment. Allowing staff academics to participate in curriculum design processes is the best method to make online resource sharing practical. (14)

These are compositions that link to the effectiveness of online learning management, which includes (15):-

- (1) Knowledge that is consistent with curriculum learning.
- (2) Innovative design for use in online teaching and learning management.
- (3) Expression of teaching design and the ability to organize learning activities that emphasize the process of reflection between learners and teachers.

The increasing rise and interest in online learning has highlighted numerous concerns about learning design to enable both synchronous and asynchronous learning: What are the most effective online institutions and infrastructure? What changes have occurred in the roles of staffs and students? What are the best modes of interaction and communication? What is the current state of affairs and future trends in learning strategies? (16) According to studies, the process of product design education in most design curriculums is such that each student presents their proposals to professors during the semester after performing practice and designing at the staff or at home, and they fix the problem, or so-called correction, with the help and guidance of their staff. Of course, this occurs after

the students have completed the introductory activities and collected their initial studies. (17)

Learning strategies

The strategy is the way that is chosen in response to the numerous circumstances and factors in the educational environment. The more aware students are of the strategies they employ, the more effective and skillful students they will be (19) There are two types of learning strategies: direct and indirect. Each of these sorts is classified into three categories. The first group, direct learning strategies, is subdivided into cognitive strategies, which allow students to deal with knowledge directly. This first group of strategies includes reasoning, analyzing, taking notes, and outlining. Concept linking is possible with memory-related approaches. Mental design processing is linked to direct strategies (cognitive, memory-related, and compensatory). These are in charge of supporting students in absorbing and retrieving information in order for them to get experience in design thinking.(20) The second sort of learning strategy, indirect learning strategies, is also classified as metacognitive, emotional, and social. According to Oxford, (21) metacognitive methods assist students in completely managing the learning process. This implies that students can choose what is best for them based on their own needs. Students can gather and organize designs, plan a task, make a study timetable, track errors, and evaluate their achievements. (22) Successful learning strategies "make learning easier, faster, more pleasurable, more self-directed, and more effective. (23)

The learning strategies used in the product design curriculum were also a factor in the difference that occurred as a result of the learning program. The discussion and presentation strategies, for example, tremendously assisted students in developing their thinking and design skills. Discussion and

dialogue were the primary strategies used in all sessions to enable students to communicate and reflect until they reached a conclusion that resulted in integration. (24) Learning strategies for developing creative thinking skills based on designer creative problem solving ideas. The following online tools are used in design activities: Chat room, Video conferencing, Instant messaging, Web conferencing, E-mail, Web boards, Blog, Group announcements, ..etc. Using the learning strategies increased the students' focus on ensuring that the online-based learning activities were designed correctly. Through the use of design processes, students were encouraged to overcome their fear of failure. Learning strategies, on the other hand, emphasize the importance of trying design thinking.(25) stated that learning strategies enable students to gain autonomy in the design thinking learning process and become lifelong learners It is obvious that applying learning strategies is critical in the design thinking learning process, but it is equally crucial for faculty academics to provide students with opportunities to develop the various strategies and help students in the process of using them. (26)

The teaching goal for successful design thinking is to empower students as autonomous students through the use of both direct and indirect learning strategies. Instances of autonomy are evident as students grow both psychologically and emotionally and are able to manage their own learning process by taking effective actions (27).Although learning strategies are influenced by various factors, they are also flexible enough to absorb and achieve the students' needs and abilities. Even better, learning strategies can evolve into conscious decisions made by students, eventually leading to a more autonomous learning process and educational system. (28) However, coordinator specialists continue to wonder why certain students do not

use effective learning practices. Why Aren't Students Using Effective Learning Strategies? A reflection proposed three basic responses to this question: unawareness, competence illusions, and projects work and time. To address these three issues, the author advises clearly teaching the strategies and creating projects incorporating the strategies to assist students grasp their value and efficacy. (29) These actions may motivate students, boost their autonomy, and encourage intended and self-directed learning. Therefore, students must know about and know how to implement learning strategies.

Products design curriculum online

Several studies have been undertaken to examine the performance of product design curricula; the success of a product design curriculum is determined by comparing traditional face-to-face instruction against online learning. Along these lines, Noesgaard and Rngreen (2015, p 280) ask whether "various modalities should have the same measurements of performance, or should we consider product design curriculum to be a distinct learning process and thus utilize separate definitions of effectiveness?" This is an important question because the effectiveness of a product design curriculum can be assessed in a variety of ways. (30) According to research on introducing a design approach to online design, one of the most important prerequisites for greater online adoption is the development of a well-designed curriculum with dynamic and engaging content, structured peer interaction, and flexible deadlines to allow students to pace their work.(31). The research reveals that structured asynchronous online discussions are the most popular method for facilitating student participation and learning. Consider that "active learning strategies" such as staff participation, interaction with students, and stimulation of student cooperation, as well as continual monitoring and moderating of conversations, have the greatest impact on student achievement.(32)

Today's basic approach to teaching traditionally product design has not changed greatly from these past methods. For example, the Bauhaus developed a curriculum that is still widely recognized today. The Studio product design has a strong teaching strategy. (33)

The nature of the interaction between staff academics and students is a meaningful part of design teaching in the studio. This means that, the staff academics share knowledge and expertise by reflecting on the students' work in progress, and drive the co-evolution of problem and solution. (34)

Just as the traditional product design studio is arguably distinct as a mode of educational delivery in comparison to many other disciplines, the online studio must be constructed differently than other curricula offered online by universities all over the world. Instead of isolated, one-on-one communication, the online or virtual studio, as it is commonly referred to, ideally involves a "community." It appears to be unusual in its ambition to aid the creative process in a web-based environment as well as to provide online education to students of a discipline based on a somewhat loosely structured manner of learning and instructing. Online studios are becoming seen as a more appealing alternative to traditional studio instruction. (35)

In the relatively short history of online studios, there have been many different formats. Communication in the online studio can be divided into two types: synchronous and asynchronous. Asynchronous communication refers to designers working on separate portions of the design at different times, possibly without the presence of other team members. Email is an example of asynchronous communication technology. Synchronous communication, on the other hand, requires the presence and participation of all designers in the studio collaboration at the same time and is enabled by

high-bandwidth technologies such as video conferencing, shared electronic whiteboards, and chat rooms. (36) (37)

Most online studios use a combination of these communication options. Collaboration in the online studio can be classified into two extremes of sharing design assignments. Collaboration on a single assignment implies that each designer has his or her unique perspective on the entire problem. The resulting design is the outcome of an ongoing effort to develop a shared understanding of the design task. Multiple task collaboration refers to the division of the design challenge among the participants such that each person is responsible for a specific aspect of the design. Such virtual design studios (VDS) have proliferated during the previous decade. In many aspects, criteria are proposed to guide future planning for Internet-based design studio activity in contrast to the traditional studio approach. (38)

Activate blended learning.

Without a doubt, the future of product design education will be increasingly digital, with a greater emphasis on online study. As a result, in the post-pandemic period, traditional higher education administrators, practitioners, and researchers must collaborate with experienced remote education institutions and specialists. (39) Due to the shortcomings of online learning, a new approach, blended learning (BL), has emerged to overcome these shortcomings. Blended learning has a high degree of adaptability, resulting in a more efficient and effective learning experience while also boosting meaningful learning results. In this regard, the popularity of BL among most scholars has increased in tandem with the widespread acceptance of BL in a growing number of higher education institutions. (40) BL is often regarded as a successful learning strategy. (41)

Although experts debate the definition of BL, the combination of face-to-face and online learning is a widely accepted description of BL (42). BL is described as the intentional and diligent integration of the best characteristics of both face-to-face and online learning. (43) The rigorous and planned integration of online learning and face-to-face learning means capitalizing on their respective strengths while avoiding their respective flaws. To get the full benefits of BL, the right combination of face-to-face and online learning must be established. (44) In response to the construction of a collaborative and interactive BL environment, the availability of relevant and diverse online tools and resources can be tailored to face-to-face learning. If online learning technologies are suitably chosen and rigorously integrated into the learning environment, the use of BL increases contact between students and staffs through virtual communities, social networks, and computer-supported collaboration. (45) (46) It is clear how this integration is achieved by stating that "the core issue and argument is such that, when we have solid understandings of the properties of the Internet, as well as knowledge of how to effectively integrate Internet technology with the most desirable and valued characteristics of face-to-face learning experiences, a quantum shift occurs in terms of the nature and quality of the educational experience.". (47) In blended learning, lecture time is somewhat loose, which can be used to better sustain connections with students and grasp students' mastery of content in real time by employing various forms of strategies. (48)

The staff noted some benefits of teaching the BL curriculum. First, students who studied the curriculum in the BL style outperformed those who previously took the curriculum in the standard format academically. Second, the staff underlined the ease with which multiple assessment methods could be used: "These online

learning activities] allowed me to assess without taking up class time." Student interactions can give valuable data for determining student achievement in the inclusive BL curriculum. Third, within a BL framework, active learning strategies can be utilized to engage learners in group activities and drive them to contribute to the development of design awareness. Third, within a BL approach, active learning strategies can be used to involve learners in group activities and motivate them to contribute to design awareness development. (49) Numerous researchers have demonstrated that BL promotes the acquisition of knowledge and abilities in a range of fields. One of the most important advantages of BL is the ability to manage, build, and promote collaborative and interactive learning environments. Discussions are a crucial component of BL in order to deliver high-quality learning experiences that improve performance. (50)

Another significant advantage of BL is that it allows students to study at their own pace while allowing staffs to deliver tailored instruction. (51) Although it is simple to assert that BL transforms the learning environment from a traditional lecture setting to an active learning lecture setting, evidence suggests that consolidating best practices of Face-to-Face and online learning is a complex process that requires staffs to invest sufficient time in selecting and testing the appropriate technological resources in accordance with the intended tasks, knowledge sharing, activities, and learning outcomes of a prescribed curriculum. (52) When compared to the traditional teaching style, including problem-based learning (PBL) into blended learning had a favorable influence on students' acquisition of design skills. This demonstrated that the learning resources created using the Blackboard platform were helpful in boosting student performance (53) Adding problem-based learning (PBL) into blended learning was found to be beneficial in

increasing design skills since the strategy allowed learners to connect their experiences in face-to-face instruction with Blackboard platform learning. Students' programming expertise appears to have been enhanced by the online experience. The discovery that students exposed to PBL in blended learning performed better in programming validated the assertions of both PBL and blended learning proponents that the method was effective in increasing students' skills.

Learning environment and online learning

There is considerable consensus that creating successful learning environments that connect design to practical experience can help students close the design-practice gap. (54) From the standpoint of learning environments, which are defined as "the collection of settings found in physical or virtual locations that give chances for learning online," Each context is made up of a distinct set of activities, material resources, curriculum, and the interactions that result from them. From this vantage point, staff should use web-based network teaching platforms and multimedia production tools to combine the requirements and characteristics of product design curriculums. Several blended learning strategies have been adopted in the product design curriculum to accommodate diverse learning styles and time constraints imposed on staffs. Some of these initiatives are related to the successful use of online resources such as online curriculum management systems, portfolios, narrated presentations, web-based polling systems, tutorials and instructional materials released ahead of time, and asynchronous learning approaches. (55) In addition, trends in online learning are changing instruction from a conventional approach, which was more focused on constructivist approaches to learning, which are based on the use of interactive communication technologies. The main emphasis is on students' having more control over their

learning experience. Student-centered instruction focuses on higher levels of learning such as problem solving and not only testing based on outcomes. However, this learning process has to be guided through the instruction, which opposes the argument that students learn best in an unguided or minimally guided environment, which is especially important for novice designers. (56)

Curricula that use online settings to adjust learning processes can provide a more qualified and accessible manner of delivering education. Furthermore, the implementation of such a curriculum provides an opportunity to actively construct online learning communities that evolve in response to global demands. (57) The staff will provide online learning materials to enhance the learning of traditional teaching strategies and learning methods for the product design curriculum. It aims to capitalize on the impact and benefits of electronic and technological advancements, particularly in terms of enhancement, while also providing an alternative to traditional teaching and learning methods in order to achieve effective and motivated learning outcomes. (58) Every staff on staff aims to help students learn from their lectures, a process that requires a significant amount of effort and a range of lecture management strategies. It is critical that lecture management mechanisms play a significant role in improving student comprehension. (59) As a result, the coordinator develops ways and strategies to improve the curriculum. These have resulted in the development of concept product design learning, which includes design the learning strategies and ways to improve them. (60)

Curriculum structure design

The Syllabus design for product design curriculum illustration case study discusses two solutions utilized to ease unique issues that

students encounter in online teaching strategies within the Bachelor of applied arts degree at Jazan University. The two strategies used to solve design difficulties were the construction of product design video lessons to educate students on the design process of making product using 'Blackboard platform sites' and the use of creative thinking strategies to improve associated online learning activities. Developing a curriculum for In the context of blended learning products, product design requires staff academics to combine the best aspects of online learning with the best features of Face-to-face learning while taking into account student characteristics, staff academic background, instructional goals, and online syllabus. We began redesigning the product design curriculum syllabus by identifying and combining the right strategies of online and face-to-face learning. We concentrated on the preceding experiences of the academic staff, the specific goals of the product design curriculum, and the availability of an adequate syllabus. Furthermore, learning strategic problem-solving and design-based learning are incorporated into design thinking-oriented design-based learning online.

The next stage is to create the materials for the product design curriculum. Divvying the curriculum into weeks and short modules, each week includes a lecture, and each lecture in each week focuses on a specific project. To guarantee that the lecture is understood, many methods and technology should be used. So that staff can develop content in many ways to explain to students, where each lecture can have training, video, and projects. They will provide to review modules on Blackboard and prepare for the test. The instructional lectures are accessible via the topic site's "Blackboard" learning platform, which is linked with the institution. Students in the product design subject submit input on the curriculum's usefulness via the subject discussion board and feedback in the end-of-semester

survey. The learning active interactive lectures have received a lot of positive comments. According to the research, online video tutoring delivered to students via Blackboard efficiently assists students in mastering problem-solving design points and improving their performance.

1 Content Analysis phase:

The analysis phase is the foundation for all other phases. So that when doing this phase before creating the plan, during this phase, the problem is identified, and the data needed for development is gathered. So, at this point, numerous methods are used to acquire information about the required objectives. Interviews with students to determine their study requirements and needs, as well as to ask them questions about what will be available in the proposed curriculum. Gathering information from staff to determine the best ways to assist them in facilitating the process of teaching and delivering the required project objectives to students in the most straightforward and simple ways possible.

2 Design phase

The design phase is a standard procedure for describing learning strategy objectives, Blended learning online strategies into the product design curriculum, and content. In this phase, the method should be methodical, with a reasonable, orderly process of identifying, improving, and assessing planned learning strategies that aim to meet curriculum goals. It must be mix audio files, text files, video files, and simultaneous teaching on the online backboard platforms utilized in presenting lectures. This phase is dependent on the previous two phases, so if these phases are

completed correctly, the development phase will be easier. During the development stage, the learning strategy used in the product design curriculum is created and tested. The recommended curriculum is practically implemented at this stage.

4 Implementation phase

During the implementation phase, the plan learning strategies are translated into action by making the proposal system available to all.

5 Evaluation phase

This step is important because it distinguishes between weak and good steps, as well as those that need to be updated. In this phase, we measure the effectiveness and efficiency of the curriculum. As a critical and important component, the evaluation process aids in the preparation of teaching bodies and provides them with the required information to support the online process and decision-making on the continuation and development of the educational process. Staff rarely perform assessments and follow-up during regular online activities, and only end-of-semester assessments focus on outcome assessment rather than making particulars. This type of learning technique prevents learning from seeing components of student progress. As a result, a faculty member should devise a thorough and planned assessment. A jury of expert critics assesses design projects in the product design curriculum using a rigorous review and evaluation system. Each jury member offers a letter grade that is based upon the rank position of the student with the group of fellow students.

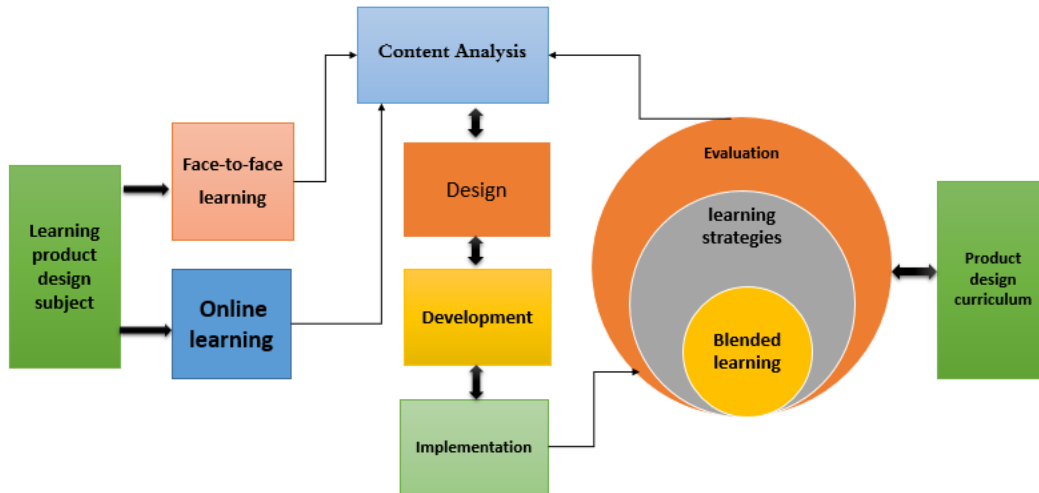


Figure 1. Suggested development steps for incorporating blended learning strategies into the online product design curriculum

Practical study

The purpose of this research is to determine the effectiveness of learning strategies in a product design curriculum. It focuses on online learning for curriculum creation or development and employs a Learning Content Management System. A product design curriculum has been taught for two semesters at applied arts department, faculty of architecture and design, Jazan University, In order to improve the process of product design curriculum in a blended learning environment, staff must consider various variables, including product design, curriculum content, new tools, and learning strategies. Many more obstacles may arise for a coordinator while preparing, teaching, and designing a blended learning program. The researchers were thinking about how to create a balance between product design curriculum, content, new tools, and learning methods. This could lead to a slew of other issues for staff while teaching and implementing a blended learning curriculum. Coordinators must display problem-solving abilities during this procedure.

Method

The study samples were from the third year of a five-year program. The subject code is subject 314 AAD (Decorated Iron) at applied arts department, faculty of architecture and design, Jazan University. The study sample consisted of university students divided into two groups: half of them studied on-campus face to face; and the other students studied online on Blackboard. This study were based on data acquired about an illustrative curriculum studied, where the same subject, syllabus and time is offered in different sessions. In addition, it used adaptive group. This research used both quantitative and qualitative data collection approaches. Qualitative data was collected at predetermined intervals throughout the study. Phase 1: From August 28, 2019 to November 11, 2020, face to face. Phase 2: From August 28, 2020 to November 11, 2020, online.

4. Results & Discussion

Compared to the control group, the results showed that the level evaluation of the efficacy of learning strategies in general is high to medium. According to measure the impact of applying these learning strategies on developing students' design thinking skills in general and stimulating creative thinking skills in particular, In all groups, the performance scores of face-to-face and online

students in the product design curriculum were high. Students who are face-to-face students are the best at finding practical uses for ideas. They state that they have the ability to solve problems and are good at making decisions to find solutions to problems. According to the findings, the data was painstakingly reviewed in order to appreciate the relationship between learning face-to-face and learning online when teaching product design curriculum. The data demonstrated a substantial relationship between professional academic performance and student academic attainment. The lead researcher's determination of the specific goals of the product design curriculum, the prior experiences of the staff academics, and the availability of appropriate online resources guided the lead researcher to assist the coordinator in the design, implementation, and redesign processes of the product design curriculum. In addition, for academic perceptions of teaching practices, use a variety of approaches such as participant observation and semi-structured interviews.

The study discovered that direct learning techniques such as mental pictures, applying ideas and practicing, evaluating and reasoning, and paying attention are supported, while metacognitive strategies and motivation are increased.

- Product design projects online should allow students to apply a variety of learning strategies throughout the design process.
- It is vital to offer alternate learning strategies that emphasize various learning types.
- Each design staff employs a unique method when communicating with students. As a result, design staff must ensure that they can apply learning concepts to the unique circumstances experienced during the design process. Furthermore, encouraging different students to contribute their broad range of ideas and design problem-solving is crucial.
- Staff must continue to foster communication, creative thinking, cooperation, and solve design problems in their online curriculum by developing flexible.
- Online learning materials are in high demand for the development of knowledge and skills. In the design learning field, interactive online learning resources are highly respected for their capacity to improve teaching and learning processes.
- Learning strategies can enhance teaching and make learning sessions more sustainable and elective. Furthermore, addressing students' learning experiences in the evaluation of teaching quality can better provide appropriate feedback for teaching improvement, thus improving students' learning strategies.
- One of the key challenges that online education faces is a lack of teaching materials as well as a lack of a classification of learning strategies. In comparison to standard lecture curriculum materials, staff can either create extra content to reinforce learning that students can access at their leisure or reorganize existing information to be compatible with design ideals.
- A learning ecology's instructional design and content elements must be dynamic and interrelated. As a result, it is vital to develop a product design curriculum that allows students to maximize the opportunities provided by online learning technology. This environment should ideally provide students with opportunity to learn through methods and models that best meet their needs, interests, and unique circumstances.
- The online learning allowed the staff to adopt active learning approaches, engage students in design thinking and promote the quality of interactive and collaborative learning assignments by means of benefitting from Blackboard as learning resources. The Blackboard platform enabled the delivery of product design materials online, the easy management of curriculum content, and the

reduction of time spent evaluating and providing comments on assignments. It is critical to provide online collaborative learning activities that allow students to share their knowledge and experiences.

- The importance of selecting an appropriate instructional strategy when developing learning environments, particularly to influence decisions about product design, curriculum design, and online learning-based staff academic.
- Students' satisfaction and learning outcomes improve when they participate in flexible learning activities and interactive learning experiences. It has been demonstrated in instructional methodologies that using a blended learning strategy can improve student satisfaction, and there is a positive and statistically significant association between interaction and learning outcome in blended learning.
- Traditional staff must understand the online learning process, the formation of the learning environment, the importance of developing relationships with students, strategies for supporting and fostering student self-regulation, connecting prior learning and future practice, design thinking, and design problem-solving.
- According to the findings, careful use of a variety of learning strategies, including direct and indirect design learning approaches, could lead to students becoming successful product design students.
- Learning strategies of research can be used by designers by online curriculums to increase quality or to enable them to solve design problems creatively. It is emphasized that many different strategies have been created to assist students with design thinking and applying design approaches.
- Learning strategies is emphasize recognizing and developing a student's ability to learn various areas of thinking, such as the ability

to understand, grasp, apply, evaluate, conclude, design, solve problems, and make judgments, as well as the ability to use tools of technology for creative thinking.

- Presenting creative design ideas inside a structured design process that a staff can use to develop the teaching process and foster creative thinking among students online is one of the learning strategies.
- Staff should use design competency practices to offer students several options and lead them through the design process, and understand the functional importance of direct and indirect learning strategies in product design curriculum.

Conclusion

This research has empirically proved that there are significant inequities between face-to-face and online learning. The main findings were that product design students were able to successfully apply design thinking learning strategies to enhance their product design curriculum of online learning activities for students. As a result, the purpose of this research is to assist staff in developing product design curriculum for better online teaching. Determine the learning strategies that will be used to access online learning resources. Determine the viability of online learning materials as a supplement to the product design curriculum. Select an acceptable online evaluation technique for the online product design curriculum. Ascertain the viability of online learning strategies as an adjunct to the product design curriculum. Choose an appropriate online evaluation method for the online product design curriculum. The outcomes of the study revealed that the selection and application of product design learning strategies impact the success of curriculum teaching and learning .In every semester, the metric used to evaluate effectiveness will be student. However, there are several study gaps on the impact of product design curriculum on educational and

training environments, as well as insufficient studies on cost-effectiveness and long-term effects.

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