Impact of an E-learning Environment based on the Design Thinking Strategy for Developing Project Design's Skills among High School Students in Riyadh

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Abstract

The study aimed to learn about the impact of an electronic learning environment based on the strategy of designing thinking about developing the design skills of English language projects for female students in the first grade secondary at the Renaissance Education Office in Riyadh.

To achieve the study's objective, the researcher used a semi-experimental curriculum. The sample was selected from first-grade secondary students from two schools of the Riyadh Office of Renaissance Education, 87 of which formed 12 groups. These groups were divided into two (6) groups in the control group and (6) groups in the experimental group. The pilot group students designed the English subject project through an electronic learning environment based on a thinking design strategy. The control group designed the projects in the traditional way. The study tool was a step-by-step evaluation measure of Rubric's project design skills. Project design skills were evaluated based on the group's overall grades.

The results resulted in statistically significant differences at an indicative level ($0.05 \geq \propto$) in project design skills between the average grades of the pilot group's students and the average grades of the control group in the remote application of all project design skills as well as the overall grade of the scale, for the benefit of the pilot group. The study's findings indicated that the scale of the impact of the proposed e-learning environment on the development of project design skills of the pilot group students was significant, with the Glass Measurement Coefficient as a whole valued at 0.83, meaning that the proposed e-learning environment has a significant impact on the development of project design skills of female secondary students.

Keywords

E-learning Environment, Design Thinking Strategy, Design's Skills, Developing Project.

Introduction

Today's world is witnessing a major technological revolution that has affected all spheres of life, including the educational sector, which is geared towards technology to take advantage of all the potential it offers.Most notably, these uses are interactive e-learning environments that achieve realistic environments as well as making use of all the possibilities offered by the Internet or the newly called web 2.0 (1)

With the existence of the Internet and unlimited communication techniques, teachers today can create their own educational environment and students, and thus share their products with others. They can also benefit from their products. These environments provide sources of diverse science and knowledge that are easily accessible and give

freedom to the learner to comment and debate. E-learning environments must be supported by good learning methods and strategies that ensure their utilization. These methods include project learning that ensures that many of these goals are achieved. Learners become responsible for their learning without often relying on the teacher. Today's requirement is to build the personality of a student researcher, thinker and independent critic who has access to information himself and can expand his own horizons.(2)

Project learning is a pattern of fun and creative learning where a student chooses a real-world theme and is usually motivated by enthusiasm for a community issue. The learner combines with his peers in answering questions or in carrying out a task or trying to solve a problem. During this process he learns learning content in a collaborative environment that mimics reality.(3)

Working in projects allows learners to take responsibility for learning them themselves. It identifies how, why and what to learn to bring the learner to levels far beyond just saving information . Project learning participates in the graduation of a new generation capable of taking responsibility, with the ability to work in an elaborate scientific way to find solutions to its problems and those of its community.(4)

Research Problem

Many studies have demonstrated the impact of electronic learning environments in raising student skills as in the Dodna Dudina study. Research results showed that sites such as Google Sites supported university teachers in raising students' motivation for learning and provided them with various interactive means. the improvement of the skills of participation in interactive websites and the researcher's reference to the existence of possibilities and tools that make students share electronically successfully.(5)

The studies also confirmed the impact of the projects and their importance in building the student's personality and acquiring learning, life and social skills that require planning, implementation, communication and interaction with members of his group, learning in collective projects gives results that significantly outweigh traditional learning from both the cognitive and the skill side and increases the student's motivation for learning. Studies that applied Design Thinking's thinking design strategy in education such as Design Thinking's thinking design strategy has helped to regulate students' work and ability to find viable creative solutions.(6)

Through field views of the Student Project Evaluation Team, the researcher acts as a member of which shows a significant deficiency in the application, where the anomalies show outdated parameters. The choice of subjects was not commensurate with the objectives, as no real problems were discussed, but they were often research projects that had no real outputs or attempts to find solutions. The students did not require higher thinking skills. Most of the projects were based on one or two students for each project

and the roles in the collective work were not clear. Attention was based solely on presentation.(7)

The reason for this is due to the newness of the projects. The criteria are largely unclear in the circulars, where a clear measure of projects has not been adopted. Also, many of the parameters are not well designed and evaluated, often due to the shortage in the teacher's development, resulting in weak outputs from the projects and their failure to achieve the desired goals. English projects also need to have a good linguistic ability that helps them to research, develop and evaluate. This linguistic ability is poor for many students.(8)

Since project education in the Kingdom of Saudi Arabia is early and has been recognized as a learning method at the secondary level and has been monitored by 10% of the grades of all subjects (Ministry Agency for Planning and Development (a), 1435). The research topic is a contribution from the researcher to find alternatives that help students to upgrade their skill by selecting, planning, implementing and presenting their projects through the design of an interactive online learning environment via new Google Sites, where a range of knowledge sources are included in a language commensurate with the level of students and a range of participatory activities that achieve strategic steps of design thinking design.(9)

E-Learning Environment

An e-learning environment as "an integrated multi-source online environment that allows learners to register, study and evaluate, through available tools and capabilities." know it as "the environment that offers the learner a certified online education with all its simultaneous techniques such as speaking (chat), video conferences, e-boards, non-synchronized such as e-mail, web pages, file transfer protocol, news groups, lists, postal forums, etc., and that learning is distributed so that the learner can get it from anywhere at any time, any way, and any speed" (10)

Procedurally known as a website by Google New Google Sites based on Design Thinking's thought design strategy, which includes knowledge sources, applications and participatory activities that allow full interaction between students or with their teachers, file sharing, and easy online communication and sailing.(11)

Projects: Projects

Projects are complex tasks that are built on difficult questions and problems. Students are involved in designing activities to solve problems and make decisions or research, giving students the opportunity to work somewhat independently over extended stages of time that end with results or offers. The projects are procedurally defined according to the Learning Assessment Manual in the Secondary Education Quarterly System Project (Department of Planning and Development (b),, which is the definition adopted in this research:(12)

"The tasks assigned to a student or a group of students by the teacher or by their own choosing that are linked to the modules and continue for a period of time in accordance

with successive and specific steps; Includes the recruitment of a number of tools and methods to gather information. Documentation and presentation of results. "(13)

Concept of electronic learning environments:

There are many definitions of the term "e-learning environments" "an online system whereby a group of users and multiple places around the world can truly interact and these environments can be in the field of education, training, engineering, commerce or entertainment. Programmes and communication tools are used to teach and assist users in an orderly manner. "(14)

It as "a learning environment through which content, learning objects and educational services are accessed by learners and communication and interactions occur between learners from anywhere and at any time using web 2.0 services in a wide space in which learners interact with learning objects and teachers and with them in the context of a genuine environment based on cloud computing models, whether done through personal computers or mobile devices".(15)

The e-learning environment as "an integrated multi-source online environment that allows learners to register, study and evaluate, through available tools and capabilities". The concept of an electronic environment has no clear limits. It is an online learning environment with a range of tools that support the educational process such as evaluation, communication, content display and uploadability, student business delivery and peer evaluation. It also provides an opportunity to manage student groups.(16)

Google Sites as Educational Environments:

There are many companies that offer free sites with ready templates that can be edited to match the designer's taste and need. These sites are not essentially designed to be educational environments but can be utilized for the possibilities and flexibility of design to suit a designer's educational needs. One of these companies is Google. Once you open an email in Google, you can take advantage of its free software and services.(17)

Google Sites Features:

1 .Create rich dynamic web pages.

2 .Any type of media such as documents, shows, photos, videos can be added.

3 .Built-in services (Google maps, Google docs and YouTube) and other services available for easy use.

4 .Create article pages that allow interaction and give space for comment.

5. The privacy of each content on the site can be easily controlled.(18)

It uses a project phrase for each research or in-depth study of a particular topic that takes time, with the participation of a group of students. It usually includes full class students where the class is divided into groups and the subject is divided into subheadings. It is important that the subject's choice is important for the students themselves. project-based learning as "complex tasks based on difficult questions and problems that cause students to engage in design, problem-solving, decision-making or survey activities, giving students the opportunity to work with relative autonomy over extended stages of time. culminate in conclusions or submissions" (19)

Project-based learning as "an organized task or a coordinated and learning-oriented product, which usually focuses on authentic learning experiences, requires in-depth investigation, promotes interdisciplinary thinking, invests benefits from collaboration, and includes ongoing evaluation".(20)

Project-based learning and 21st century skills:

Recent years have seen interest in 21st century skills. This requires students to be able to solve their problems and those of their community and to be responsible for their own learning Twelve skills called 21st century skills: creativity and innovation, critical thinking, communication, sharing, information culture, media culture, technology and communication, flexibility and adaptation, initiative, self-direction, social skills, leadership and responsibility. (21)

Ravitz and others Ravitz identified these skills as follows:

1. Critical thinking skill: It means students' ability to analyse complex problems, their ability to also investigate questions with unspecified answers, as well as to assess views and sources of information, and the ability to develop appropriate interpretations based on evidence and logic.

2.Collaboration skill: The ability of students to work with each other to find a solution to a problem or answer a question. as well as working effectively and respectfully within a team to reach a common goal and share responsibility to finish the task.

3.Communication skill: It is meant to be able to organize their thoughts, information and what they have come up with and thus effectively share them through different media, both orally and in writing.

4.Creativity and creativity: Students' ability to find conclusions for complex problems or tasks depends on installation and analysis, and then offer authentic solutions.

5.Self-management skill: It is meant to be able to take responsibility for learning by investigating and tracking subjects for learning. Also the ability to review its work and respond to feedback.

6.The skills of communication with the outside world: It is intended to mean students' ability to understand global issues and the geographical, cultural, linguistic, historical and moral awareness of other peoples.

7.Intercom: It means students' ability to apply what they have learned to their community and internal issues.(22)

Conditions to be met in students' projects

Not every collective work done by students is a project. mentioned certain conditions that must be met in projects offered by students:

1 .Students must participate in the choice of subjects.

2 .The project is an open-ended question.

3 .Talk about a real problem, not fictional or non-existent.

4 .The lack of activities proposed by the teacher to students.

5 .Student-led survey.

6 .There should be clear criteria and specific methods of evaluation.

7 .The student manages the time based on the appointments set by the teacher.

8. Participation of all students at the same level.(23)

How to evaluate student projects

Students develop 21st century skills through project-based learning that will help them become active members of their communities. Many of these skills cannot be measured by traditional methods. The best way to evaluate them is to use Rubric's graded rating measures. Since students' projects are diverse, using one template to evaluate them all is not a valid solution. The design of step-by-step estimation measures must be done through specific tests that depend on the quality of the project, the objectives to be achieved, the skills to be focused on, as well as how long it lasts. Teachers can also use pre-prepared graded rating measures that they can obtain from different books or websites. However, it would be preferable to adjust them in proportion to the projects to be implemented. It is also necessary to evaluate the student for himself so that the student can assess the extent of the student's cooperation from his or her colleagues in the group. How he participated, discussed and listened. How he welcomed the ideas put forward to him. (24)

Historical look at thinking design:

The first mention of thought design was in the field of engineering in 1935 by Dens and Thomas Dennis & Thomas in a debate about the possibility of placing an electric generator to alert in factories. In 1944, it was more explicitly mentioned in Motor Boating and expressed as technical stages used by engineers to design engines.(25)

One of the old uses that suggests the evolution of the concept of design thinking from a mere strategy of sharpening ideas to a product design is what was stated in the 1957

American Ceramics Community publication, which showed how designers can learn to design thinking and emphasized the need to change from mere concepts and ideas to production lines. In 1965, Bruce Archer began to emphasize cognitive aspects and multiple disciplines to practice design, develop a mechanism and approach to think design. (26)

The design was conceived as a way of thinking put forward by Herbert Simon in 1969 in his book The Science of Articles, but it became more apparent in Robert McKim's 1973 book Experience in Visual Thinking. Rolfe Faste then expanded MacKim's work in the 1980s and 1990s while teaching at Stanford University. He defined and disseminated the concept of thought design as a method of creative work adopted for trade purposes.The first appearance of the term design thinking in the design literature was in 1987 in Peter Rowe's book Design Thinking. Richard Buchanan, in 1992, expressed in an article entitled "Wicked Problem of Design Thinking" a broader and inclusive concept of thought design.(27)

From reading in the history of the evolution of the concept, we find that during the 1980s the concept focused on understanding people's needs and trade needs, which were quoted from design trends at the time and centred on the beneficiary. David Keldid Kelly, Larry Leifer and Terry Winogradd were credited in the 1990s with the emergence of the design-thinking reformer we know today as their research referred to the mental stages behind the designed products. Two decades later, attention appeared to have had an impact on education in general. In 2005, Hasoo Platter volunteered 35 million United States dollars to support the Hasoo Plattner Instute of Design School in Stanford, which adopted the teaching of thought design as a method. It is this method that is taught today in many universities and leading schools. (28)

Design Thinking Design Characteristics:

1.Uncover mystery: Deal with ambiguity and lack of clarity with satisfaction and try to identify and define the problem before you start finding solutions.

2.Collaboration: Learners are allowed to work with each other orderly in disciplined design groups.

3.Conclusion and construction: Building new ideas from old ideas that may be more successful ideas that seek improved future solutions.

4.Curiosity: Curious to know what the learner knows. and looking at it with a new perspective.

5.Compassion: the ability to understand the problem and view it with a real problem-bearer's perspective. The learner put himself in the place of the problem. and know his needs.

6.Overview: The design of thinking is characterized by its perception of the problem in all respects. and trying to find solutions for the problem-maker and society at large.(29)

::**The relationship between the design of project-based thinking and learning:**

One of the most important reasons for a project's success is its good planning. Planning is a roadmap and the more a project addresses a complex problem the more it needs to plan. What the strategy of thinking design is based on the development of the project's road map. Since students' projects are designed to prepare them for public life. Thought design is the guide they will apply in their lives as well.(30)

Adopting thinking design as a methodology for student projects ensures the necessary compassion for creative work collectively both within and outside the classroom. (Learners will feel that they are the source of change and that they find solutions to problems, they will be more aware and attentive to how to build their ideas. Students can access knowledge through action and work and will be disciplined as never before. Teachers who have adopted this strategy in their students' projects will view themselves as supervisors of cognitive, skilled and social development and will witness this shift in thinking among students.(31)

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