

treating various diseases including tumors, especially malignant tumors, using radioisotopes is an associated benefit. Treatment relies on the selective biological effects of radiation on tissue cells. Sick and healthy cells respond differently to radiation. Another more accurate method that scientists recently found is suspense with the assistance of nerve centers that control metabolic processes in diseased organs. Radioisotopes are widely wont to monitor technology and industry processes.

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BLENDED LEARNING AS AN APPROACH TO THE DEVELOPMENT OF EDUCATIONAL AND METHODOLOGICAL SUPPORT OF ACADEMIC DISCIPLINE

Abstract

A research study on the blended learning approach to the development of teaching aids for providing basic solutions for nuclear power plant construction – team project, has been conducted. Various tools such as smart tables and smart boards known to yield productive results by renowned and well-established tertiary institutions were employed in this research study. It is challenging to guarantee a perfect teacher-student knowledge transfer, which is expected in the traditional classroom approach. With the many case study assessments researched on, it has been realized that the traditional face-to-face lessons merged with online development and use of electronic booklets, organization of YouTube videos, presentation of digital content, adaptation of 3D animations, and the use of other educational tools are productive-guaranteed models of ensuring the arousing of student interest and encouraging innovative ways in the way students adapt knowledge as showed in table 1. This establishes a goal to develop an enthusiastic friendly and innovative mechanism to satisfy the expected outcome with key performance indicators. Such alternative methods provide students with options to align themselves

with the mentality of completing the tasks required for final certification. Blended learning integration into the course work models is therefore a must have tool to enhance departmental development. This paper consist of five (5) pages and one (1) table.

Introduction

Blended learning serves as an effective interactive approach to aid application of the theoretical and teaching materials available to provide a platform for learning at in the classroom and online, thereby presenting an environment of convenience for the absorption of knowledge[1]. This design goal is to facilitate the development and use of a friendly and innovative mechanism that allows both students and the teacher to attain appreciable expected learning outcomes. The quality of these expected learning outcomes can be realized in the steps of attaining a meaningful measure design [5]. These steps are: Beginning with the end in mind, Being sensory-specific, Finding potential measures, Checking the bigger picture and Naming the measures.

Justification

The order from the management of the National Research Tomsk Polytechnic University issued in March 2020 stated the need to adapt online lessons due to the pandemic situation [2]. The need to enhance effective transfer of knowledge from traditional resource libraries and teacher content material has called for an introduction of a mechanism that allows both students and teachers to conveniently approach studying and teaching with a higher level of enthusiasm. From the case studies of various educational institutions, the concept of blended learning may be summarized as the fusing of face-to-face classroom instruction contact hours with various online digital media efforts at relaxed but yet regulated periods[1]. The benefit of this is that students are encouraged to confidently share their views through various available modes. Several advantages have been cited with the implementation of the blended learning approach. A few of these are that:

Both fast learners and slow learners enthusiastically get to advance at their own comfort;

Students engage with learning material when they are most alert;

Students with unique physical or mental challenges are more relaxed to participate.

The ability for students to work in groups, helps them to train in coordination and acquiring skills for future leadership positions.

Some of the notable case studies are discussed. From Montreal, Quebec, Canada, the CONCORDIA UNIVERSITY describes how blended learning can increase social interaction between the teacher-student and peer-to-peer cooperation, increased flexibility in the design of teaching, increased access to course materials and availability of more time spent engaging with course

content [1]. The Los Alamos National Laboratory (LANL) provides the opportunity for various stakeholders to collaborate with [3]. The Southampton University also provides a resource guide that covers how to structure an essay and develop an argument. A tactic popularly titled as “Hammering the prose” in an academic guide to writing essays[4]. This tool will be a great asset for students in the class to enhance the development of the scientific end of semester project. This project enhances and reveals competency of research delivery in the students. This research then realises an effective transfer of subject specific intellectual and research skills with the students.

There is however, the challenge of monitoring the contribution of individual student’s performance during unit group task assignments. This is partly resolved during face-to-face contact hours, where proposed solutions to assignment tasks are assessed and queried based on what every team member has contributed.

Implementing Blended Learning With Existing Classroom Modules

Purposefully, Blended Learning allows the creation of the most effective medium of transferring knowledge to the student. At the centre of the implementation program is the teacher who conveniently transforms from being just an instructor to a coach, possessing an adapted mechanism for performance measurement. During implementation, there are some notable expected challenges that may occur, depending on the resourcefulness of the implementing organization or individual teacher. Such challenges may include but not limited to the following:

Ensuring that the technical resources being used are affordable, reliable and easy-to-use for both the students and the teacher, could be a great challenge.

The teacher’s job is also to observe that the content is reliably and independently being consumed by students and that the student comes to class prepared. This could be a challenge for the teacher.

One of the biggest challenges is that Blended Learning changes the role of the teacher to that of a coach. The student is taught how to think and at the same time, enlightened on what to learn.

This research has developed a simplified structural table which summarizes the content, target audience, distribution of teaching hours, some blended learning activities, supplementary aids available and possible learning objectives (i.e. knowledge, skills, competences, students’ performance etc.).

With the acceptance and adaptable standards positioned appropriately for the implementation of Blended Learning, a measurable extent of integration for the existing curriculum needs to be considered.

Detailing into table 1, a more comprehensive overview of the course under discussion can be found.

Table 1. A brief analysis of a taught course with Blended Activities

Name of the course	Target audience	Distribution of teaching hours	BL activities	Supplementary aids available	Possible learning objectives
<i>Development of Basic Solutions for Nuclear Power Plant Construction, Team Project.</i>	Second Year Master Students (Nuclear Engineering).	64 hours of Blended Learning Activities and 32 hours of independent studies.	Construction of a Nuclear Facility, considering factors such as the Fuel cycle. Lessons learnt from accidents with respect to safety and security.	Case Study analyses of events that led or could have led to the theft / sabotage of nuclear or radiological material via presentation of digital content, adaptation of 3D animations, and Youtube videos on Smart tables and Smart boards.	Building competencies in identifying potential risk, existential threat and vulnerabilities and projecting the possible consequences of emergency situations.

The title of the taught course is – “Development of Basic Solutions for Nuclear Power Plant Construction, Team Project”, coded 14.04.02. This course has been designed for second year master students who are likely to find themselves working with several nuclear facilities at many organisations around the world. The course has thirty-two (32) f-2-f lecture sessions; sixteen (16) Practicals lessons; sixteen (16) Laboratory lessons; and thirty-two (32) End of Semester Team Project sessions (Independent studies). The course has been designed with the focus of blended learning integration based on specific adaptive instructional method and learning format. Students are given the opportunity to design, construct, commission and even decommission hypothetical nuclear facility projects. A comprehensive report is then developed by the students and submitted to the supervisor.

The key performance indicators experienced in the Practical lessons and Term Project tasks are much easier to identify [5].

Conclusion

Blended learning serves as a platform for integrating on-line teaching methods and its activities with face-to-face contact hour lessons, using various innovative educational solutions. The developed simplified content in Table 1 elaborates on the primary task, target audience, distribution of teaching hours, some blended learning activities, supplementary aids available and learning objectives. Other important outcomes of this research study approach include the proposal to develop an electronic booklet for student usage and also to serve as a revision tool, after the routine laboratory and practical sessions. The knowledge acquired from this research is quite valuable for developing teaching strategies and for organizing students independent (online) activities.

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THE DEVELOPMENT OF TEACHING AIDS FOR NUCLEAR POWER PLANT COURSE INTEGRATING BLENDED LEARNING FORMAT

Abstract

Teaching Aids assist instructors facilitate the process of teaching and learning. Instructors are now adopting different ways of delivering the course