Students’ Perception in Blended Learning among Science and Technology Cluster Students

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Abstract. Higher education institutions promote flexible learning environment to students in accomplishing learning objectives. By allowing ‘everywhere and anytime’ environment to students for learning plus technical infrastructure, they may have more opportunities to learn and practice their knowledge for achieving success. The purpose of the study is to document and give some elaboration on their experience in blended learning environment. By obtaining result from survey from 139 students with science and technology background, this study highlights three elements of blended learning namely achievement in learning, improvement of learning skill and adoption of social presence. There is a positive perception in blended learning environment among students of Computer Science. According to the results, blended learning in i-Learn platform offers great flexibility, which allows students to have easy access to allows learning at any time and place.

1. Introduction
Nowadays, higher education institutions promote flexible learning environment to students in accomplishing learning objectives. By allowing ‘everywhere and anytime’ environment to students for learning plus technical infrastructure, they may have more opportunities to learn and practice their knowledge [1] for achieving success. In implementing blended learning, students and instructors are able to use their creativity in teaching and learning which can be supported by traditional classroom as well as virtual classroom as the learning environment. By having blended learning as a platform to learn, students are able to experience various teaching methods and obtain opportunities in optimizing their learning process using various Web 2.0 tools. E-learning can bring convenience to students and instructors since it allows them to communicate regardless of different geographical location and time with certain speed and performance. E-learning must be supported by technology whereby it keeps up learners throughout their learning process. Blended learning is practiced in the higher education institutions by adopting the collaborative learning concept whereby all community members can share and exchange information hence contribute to the evolvement of knowledge with and without face-to-face learning environment. Previously, Serban has carried out a research to see the effectiveness of blended learning for distance learning environment [2] whereas this paper focuses on students’ perception on blended learning in accomplishing course learning objective. This paper will look at Science and Technology cluster students that are doing full time studies. Next, this paper will produce the result on students’ participation in blended learning. Section 2 reveals literature that is related with
this study such as participation in blended learning, advantages and disadvantages of blended learning, examples of students’ activities in blended learning, social interaction in blended learning and also existing study in blended learning. Section 3 explains the methodology of this study. Next, Section 4 discusses results of this study and Section 5 concludes the paper.

2. Related Literature
Section 2 elaborates literature from subsection 2.1 to subsection 2.8. Subsection 2.1 reveals on how students participate in blended learning activities. Subsection 2.2 depicts advantages and disadvantages of blended learning for learning process. Subsection 2.3 explains describes learning scenarios in teaching and learning while adopting blended learning environment. Subsection 2.4 discusses on how social interaction exists in blended learning. Subsection 2.5 elaborates on existing study on blended learning. Whereas Subsection 2.6, 2.7 and 2.8 reveal on how blended learning can contribute to achievement in learning, improved learning skills and also improvement in social presence among learners.

2.1. Participation in Blended Learning
Learning process in higher education involve instructor who deliver the course contents and the students who received the contents. In traditional classroom setting the learning process normally takes place in classroom and students participation can be seen where students attend class and listen to the lecture, doing other activities such as tutorial, assignment, discussion with peers and instructors and any other course assessment. Currently online learning is pervading in higher education. The universities are competing to design a better course which includes online learning in their curriculum design as a whole method or blended. Many universities use Learning Management System(LMS) as their online learning platform to complement face-to-face learning in various types of setting. LMS system tools are varied depending on the LMS itself. Informally the LMS contained course contents, assignments, assessments, forum and etc.

By adopting online learning to complement the traditional classroom, participation in online learning should be also measureable as in the traditional classroom setting. According to Rahman and Sahibuddin [1], online participation can be in variety of activities such accessing learning resources and constructing knowledge collaboratively with peers. Pandit [3] suggested four categories of online learning participation:

• Information access: students use LMS to access learning resources such as lecture notes. The LMS makes the course content available 24 hours and 7 days and boundless in time and distance. The currency of course content is also guaranteed.
• Interactive learning: students engage with interactive learning elements namely online exercises with immediate feedback. This to make sure that students do not feel lonely during attending LMS.
• Networked learning: students use technology to facilitate communication, and collaboration with teachers and peers such as through online discussion forums and wikis. With this tool, students can share knowledge with peers.
• Materials development: students use technology as a tool to build and present their own works namely multimedia presentations in response to the task or course requirements. This tool can ease students in completing the task given by instructors.

Therefore, students’ participation in online can thus be measured simply by counting the frequency students are involved in each of four categories above. Students participation in online learning in terms of interaction can be described as Ranieri et al. [4]:

• Student with content
• Student with instructor
• Student with student
2.2. Blended Learning: Advantages and Disadvantages

Blended learning environment typically involves contact teaching with an instructor and other complementary online learning delivery modes [5][6][7]. In blended learning practice, students attend conventional instructor-directed face to face classes with synchronous communication [8], and use advanced online learning technologies [9], including an online learning management system. Online learning management system in Malaysia higher education is not new as all universities have implemented blended learning. Blended learning remains as interesting research since it could offer new opportunities and improves teaching and learning process.

Blended learning is widely applied in higher education as it could create more flexible modes of education, and personalized learning trajectories [10][11][12][13]. The flexibilities offered by blended learning allow students to have some control over time, place and pace of learning. Students could access subject content anytime because blended learning is a synchronous communication. Furthermore, students could access online learning system from anywhere that has internet way in which not restricted to be in the classroom [14]. In addition to this increased accessibility, blended learning through online learning offers students progressing at their own pace when studying the online subject content. Lecturer could post any online learning activities for ideas sharing among students. Most students still talk more in an online discussion than in a face-to-face environment, lending evidence to the perception that blended learning tends to draw shy students out of their shells.

However, the flexibility in term of time and space in blended learning has leads to an enlarged psychological and communication space, called the transactional distance [15]. This will affect the teaching and learning process because when transactional distance is high, instructors cannot immediately notice when students encounter problems, or they may not have a good idea of what students have actually learnt [16]. Somehow, many students need the flexibility offered by the blended learning method, but do not want to lose the social interaction and human touch they are used to in a face-to-face environment [17].

Success of blended learning depends not only on the quality of the course and the virtual environment but also on the grade to which the students are prepare to work in their virtual study environment. It also depends on their ability to make them organized in a given background and use all the tools offered by the online learning management system. The students will get demotivate if they don’t know how to access the learning content or use the devices. Besides, students must have discipline and know to manage their time. As such, several researchers have found that increased flexibility and learner control are especially beneficial for high achievers or students that possess self-regulation skills, while low achievers may not yet possess the required skills for independent learning [18].

2.3. Examples of Students’ Activities in Blended Learning

Interaction and participation of student regarding to e-learning has been recognized as one of the most important components of learning experiences and are widely documented as having positive benefits for student achievement and on evaluations of online course material. E-learning has the benefits of being student-centered and flexible in terms of time and location, and allowing knowledge reuse and easy sharing [19]. One of the approaches in e-learning is mixed-mode e-learning (MMEL) [20]. MMEL is a type of blended or hybrid learning that combines classroom and Web based methods [21]. As the terms “blended learning”, “hybrid learning” and “mixed learning” are used interchangeably in literatures [22][23], they refer to the integration of learning delivery methods, including most often face-to-face instruction with multiple asynchronous and/or synchronous technologies by means of computer, mobile phone, satellite television channels and other emerging electronic media.

Most of the course in public university was designed as blended learning environment where student and instructor meet weekly face-to-face and received the course materials online. The instructional materials were delivered to instructors and students using a propriety online course management system via the Internet. In blending the online content with either lecture-based or problem-based instructions [24][25], there were face-to-face classroom meetings, but the classroom activities were different.
In blending the lecture-based approach with online content, the activities were as follows: (i) the instructor presented the content, (ii) discussion of the content took place among the instructor and other students, and (iii) hands-on laboratory activities were conducted. In blending of problem-based approach, the classroom activities were as follows: (i) an ill structured case with problems related to the week’s content was provided and explained, (ii) students were required to work in groups of two to discuss the case and determine what they needed to know, and (iii) students were asked to write a problem statement and possible solutions. All these are shown in Table 1.

**Table 1.** The differences activities in blended learning environments.

| Student Activities | Lecture-Based Approach | Problem-Based Approach |
|--------------------|------------------------|------------------------|
| (i)                | The instructor presented the content | An ill-structured case with problems related to the week’s content was provided and explained |
| (ii)               | discussion of the content took place among the instructor and other students | students were required to work in groups of two to discuss the case and determine what they needed to know |
| (iii)              | hands-on laboratory activities were conducted | students were asked to write a problem statement and possible solutions |

2.4. Social Interaction in Blended Learning

E-Learning as a tool for knowledge management introduces collaboration concept in the community. Therefore, it is very imperative to emphasize that knowledge management tools must come together with knowledge management techniques in order to achieve favorable learning environment and to allow learners get acquainted among themselves and thus stimulate matching understanding to users’ knowledge [3].

E-learning technology is used to cater sharing knowledge activity among learners and other activities via online [26]. Therefore, collaboration element should be imposed in learning technology so that collaboration can be done in the e-learning milieu. The issue in collaborative learning is to have effective collaboration among group members. Effective collaboration will result the best outcome from the face to face discussion [27]. There are elements like good preparation of software and other materials which can stimulate collaborative learning environment. Good atmosphere of collaborative learning experiences encouraging question-answer session among students and they can challenge each other to answer questions in E-learning.

There are issues discussed related to online learning practice and its concern with collaborative learning. Those issues are on the subject of course preparation, creating good environment among online community, instructor’s task, promoting collaboration method in online distance learning and technology effectiveness. There is a study that emphasizes about learner’s instructional needs, motivational preparation for learners enable online distance learners to have information exchange and interactivity [28].

2.5. Existing study in Blended Learning

Blended learning is an approach to education that combines online educational materials and opportunities for interaction online with traditional place-based classroom methods. A variety of research results presented in this study are aiming to discover the overall effectiveness of online and blended approach over traditional learning method [28] attempted this experiment of the use of blended learning. It was shown that the use of blended learning has a positive effect in reducing dropout rates and in improving exam marks. Moreover, the students’ perceptions on blended learning are interrelated, with their final marks depending on the blended learning activities, and on the students’ age, background
and class attendance rate. According to Boelens et al. [26], high achiever students [29] preferred the blended format over fully face-to-face or online while Low achiever students may have difficulty coping with the blended environment. The results of study the impact of an online workbook on the attitudes of 245 second language Spanish learners shows a significant increase in grammar scores [30]. These results are consonant with the positive findings of student perceptions about the online workbook obtained in this and previous studies, emphasizing its benefits in terms of accessibility to the material, user-friendliness, and instant error feedback.

2.6. Achievement
Blended learning has changed the learning center point, from teacher to student. At the same time, it offers previously unthinkable possibilities of interaction and access to knowledge virtually anywhere in the world [1]. It has been applied in many field of education such as business study, computer study, medical sciences, working professional and others. Lieser et al. [31] observes blended learning courses offer ease of access, interactive pedagogy, and are cost-effective and flexible. While blended learning has shown positive impact, some of the studies do not offer fully blended learning courses. For example, nursing program. The other study carried by Terry et al. [32] has found that while blended learning courses have several potential benefits and high contextual significance for working professionals, they are faced with technical, organizational and instructional design challenges that can disrupt their adoption.

2.7. Improved Learning Skills
Students prefer blended learning because e-learning is flexible as it could be accessed anytime and anywhere. Besides, students may have control in terms of path, by determining the order in which the content is provided in the course [33]. It is also could improves student language skills in term of reading skill and listening skill. The learning approach in blended learning which is student centered learning could motivate student and give opportunity to students for self-directed learning. Students enjoy e-learning because they can simultaneously check the answers by themselves.

2.8. Social Presence
Social presence is an element that exists whenever users are socially interacting in a collaborative application. By using E-learning, learner will be able to interact by participating in forum, discussion, online quiz, et cetera. Social presence is needed to support blended learning system by sustaining active participation among learners. A higher social presence leads to greater interaction among the users, as such; the social requirements can be obtained during the requirements elicitation [34]

3. Methodology
The purpose of this study is to obtain perception from science and technology students in using blended learning. The research is a descriptive study where it describes the characteristics of the samples. This study focuses on the students’ perception on blended learning in Science and Technology cluster in UiTM Kelantan Branch, Malaysia. These students use an E-Learning application which is known as i-learn. A sampling approach will be used to collect data from a group of students from UiTM Kelantan. The research involves online questionnaires.

A set of questionnaires was given out to 139 respondents from Faculty of Computer Science and Mathematics in UiTM Kelantan. The samples were picked using convenience sampling since it is implementable. Convenience sampling is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in study [35]. The result of this study is reported in Section 4.
4. Results and Discussion
Section 4 reveals demographic information, result of blended learning in terms on achievement, improved learning skills and social presence for blended learning environment of science and technology cluster students.

4.1. Demographic
In this study, 139 students were completed the online survey. Figure 1 shows 19.42% of the responses from male students while the remaining 80.58% of the responses from female students. Figure 1 also shows the response based on age, program and part. The result shows the student range of age between 20-21 years old with 76.26% had the highest response as compared to the other ranges. While the students from Bachelor of Statistic (CS241) shows the highest response with 52.52%, followed by the students from Diploma in Computer Sciences (CS110) 27.34%, Diploma in Mathematical Sciences (CS143) 17.27% and the lowest one was from Diploma in Statistic (CS111) 2.88%. On the other hand, the result also shows the highest response from student part 3 with 37.41% and the lowest response from student part 6 with 2.16%.

![Figure 1. No of student based on gender, age, program and part.](image)

4.2. Achievement
Achievement can be seen as a stage of obtaining desired goal by executing several tasks [34]. In this study, the success of blended learning has been investigated based on their achievement in the learning process. Figure 2 shows 56.67% students agree that blended learning that they have used can be applied to another subjects, 40.67% students think that their learning style and results have improved by using blended learning. These results show positive impact on blended student among Science and Technology cluster in UiTM Kelantan Branch.
4.3. Improved learning skills

Students must empower various learning skills to help them accelerate their learning process. Figure 3 shows 77% of students agree that blended learning has improved their learning skills. Learning using slides prepared by the lecturer is not the only way conducted in blended learning. 74% students usually join online discussion in i-Learn whenever there is a topic to be discussed. 50% students use Facebook as a medium for communication and learning. Besides, 76% of students say that procedural video could help students understand their course more thoroughly. While 62% students agreed that online flash lectures help them in their study. Therefore, it is agreed that blended learning could help students to gain multiple learning skills which eventually could enhance their achievement in their study.

Figure 2. Achievement in Learning Process.
4.4. Social Presence Experience
The result shows that over 74% students have positive attitudes towards blended learning with the supports from friends who joined the blended learning. While 70.5% thinks that UiTM online learning platform namely i-Learn is helpful in communication and interaction with instructors and among friends. Blended learning also contributes to students’ motivation in learning whereby 64.7% students are interested in seeking more knowledge in their course by using i-learn.

Blended learning with i-learn makes 66.9% of students happy to explore and use online tutorials. Students are also very committed in using i-learn by checking announcement, discussions and online tutorials, which 57.5% students involve with i-learn every day or at least once a week. Overall, students do not feel reluctant to study in blended learning setting as shown by the result where 74.1% have positive impression on blended learning.

Figure 3. Improved Learning Skill.
Overall, this study is able to produce results on acceptance in blended learning among Science and Technology cluster students which have been implemented in UiTM Kelantan Branch. This study also able to elaborate on student experience in blended learning environment. This study found out that blended learning gives positive impact to students whereby students are able to achieve better result by using blended learning. The students also reveal that their learning skills have improved after participating in blended learning environment. Blended learning also motivate students to learn with the aids of forum and discussions tools which can make them easily discuss anything related to their courses.

However, there is a limitation found in this study. The success of students in blended learning depends on students’ effort since active participation affect their learning quality. The students have all the control on whether to fully utilize and make use of the learning environment or otherwise. As the consequences, there may be less performed students who cannot benefit much from blended learning.

5. Conclusion
As the conclusion, blended learning offers great flexibility for students in higher education. They can be active and anticipate with the learning environment in order to achieve greater results. This study found out that blended learning gives positive impact to students whereby students are able to achieve better result. This study also reveal that their learning skills have improved after participating in blended learning.
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This study is able to reveal the understanding of Science and Technology cluster students in involving themselves in blended learning. To anticipate with The Fourth Industrial Revolution (IR 4.0), the students need to take the full advantage of the technology to ensure best possible experience in their learning process.

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