Degree of Learner Autonomy among University Students

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ABSTRACT: This one-group pretest-posttest quasi-experimental study examined the degree of learner autonomy among first-year students of Gyalpozhing College of Information Technology (GCIT) who were taught using the 'Learning by Doing' approach. A total of 62 first-year students taking BSc in Information Technology in the first semester of the academic year 2021 participated in the study. Participants completed pre-and post-closed-ended questionnaires at the beginning and the end of the course and a semi-structured interview at the end of the semester. The quantitative data obtained from the closed-ended questionnaire was analyzed through descriptive and inferential statistics, and qualitative data using content analysis. The findings from the study shed light on students' level of learner autonomy and their readiness to embrace self-directed or independent learning approaches such as 'Learning by Doing'. The study also unveiled benefits and challenges faced by students whilst studying under the 'Learning by Doing' pedagogy, which will eventually help in addressing the issues and enabling students to be responsible for their own learning. Overall, the results from this research revealed that learners can enhance their learner autonomy with proper training and pedagogical tools in place. The study, therefore, recommends teachers to incorporate student-centered learning approaches such as 'Learning by Doing' to enhance learner autonomy among students.

Keywords: learner autonomy, learning by doing, online learning

Introduction

The advent of technology and the digitalization of the teaching-learning process has contributed to the emergence of online learning. Increasingly, educational institutes are implementing online learning as the main instructional method, and the COVID-19 pandemic has further exacerbated dependence on online teaching-learning methodology (Rapanta et al., 2020). As online learning is distinctly known for its flexibility in terms of time zones, location, and distance, it is often assumed that the use of technology in teaching and learning fosters learner autonomy (Anderson, 2011). Learner autonomy is a quintessential skill in both online

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learning and the conventional learning environment. However, Clark claims that technologies are merely vehicles that deliver instruction, and do not themselves influence and regulate students' learning process (1983 as cited in Anderson, 2011). Usually, online learning programmes assume an already developed degree of autonomy for self-directed learning among students, but many students may not yet have developed adequate autonomy for independent learning.

Given that higher education in Bhutan is at a nascent yet pivotal stage, the emphasis on 21st century education has been of paramount importance. Several pedagogical innovations pertinent to equipping students with skills and competencies to respond to the economical, technological, and societal shifts have been introduced in all the integral colleges under Royal University Bhutan (RUB). In particular, Gyalpozhing College of Information Technology (GCIT) has adopted an experiential learning approach known as Learning by Doing (LBD). Learning by Doing was first propounded by John Dewey and he described it as progressive education where learners socially interact and engage in the learning process (1938 as cited in Williams, 2017). Flinders and Thornton (2013) also support Dewey's belief and define education as a "process of living and not a preparation for future living" (as cited in Williams, 2017, p.35).

Pedagogically, Learning by Doing is more inclined to learner-centred practices where learners actively participate in the learning process and influence the content, activities, materials, and pace of the learning and assessment process (Wrenn & Wrenn, 2009). This pedagogy was formally launched at GCIT with the introduction of the BSc IT Programme in July 2020 with a batch of 66 students. Thus, the students enrolled in the BSc IT Programme were expected to have a certain degree of learner autonomy to be able to embrace the Learning by Doing approach. However, as the Bhutanese high school education system is largely dominated by teacher-centred approaches and a culture of reproduction (Dorji et al., 2013), it could be a potential barrier for undergraduate students to adopt autonomous learning approaches such as Learning by Doing. The teacher-centred approach uses the didactic method with the objective to transmit knowledge from teacher to student. The focus is more on teaching the content than on students' participation and contribution to the learning process. The teacher decides and controls the instructional methods, curriculum, and assessment without any involvement of students (Gyamtso & Maxwell, 2012). Given these premises, teacher-centred pedagogies are criticized for their lack of collaborative learning activities and their focus on the end product rather than the learning process.

On the other hand, in the student-centred approach, learners have complete control over the learning process. They select the learning materials, monitor, and evaluate their own progress. Students are expected to be autonomous learners with the ability to make decisions, the capacity to take responsibility for their own learning, and the skill to critically evaluate their own progress (Doyle & Parrish, 2012). 21st century education mandates students to be self-directed as it enables them to learn anytime and anywhere using online tools and open-source software. The present paper, therefore, examines the degree of learner autonomy of first-year

students and their readiness to adopt a self-directed learning approach such as Learning by Doing.

Research Questions

This study investigated the following research questions:

1. Is there any statistically significant difference between the pre-and post-closed-ended questionnaire in terms of learner autonomy?
2. What is the perception of students about the Learning by Doing (LBD) approach?

Literature Review

Learner Autonomy

During the 21st century, autonomous learning approaches have become vital in the field of computer science and information technology as a consequence of the ever-changing and fast technical advancements. Holec (1988) defined learner autonomy as the ability to take control over one's learning. Learner autonomy is also explained as a "capacity for detachment, critical reflection, decision-making, and independent action" (Little, 1991, p.4). The definitions of learner autonomy differ but it is generally agreed that learner autonomy is a matter of degree, implying development from lower to higher level of autonomy (Benson, 2011). Learner autonomy is often misinterpreted as informal out-of-class learning in which learners independently take control of all aspects of their learning. In this view autonomous learning is treated as secluded activity, where learners need to be intrinsically motivated to learn out of the classroom, alone, and with no support and scaffolding from the teacher. However, learner autonomy can be developed in a formal learning environment such as a university and adopted as a student-centred pedagogy and part of the learning objective. There are two types of autonomy, namely, proactive and reactive. Proactive learners are self-directed and have complete control over learning in comparison to reactive learners who are responsive to tasks and react by choosing preferred strategies, materials, and goals to achieve learning objectives formulated by teachers (Benson, 2011).

In university, students adopt diverse learning approaches such as deep, surface, and strategic learning, and teachers are often left bewildered and in a conundrum, not able to meet individual students' needs. Thus, university students must develop learner autonomy to manage their own learning (Geertshuis et al., 2014). Generally, university students are assumed to be more autonomous than high school students in terms of taking initiative and learning independently. However, in reality, students need support to develop their autonomy, as it is not innate but a learned skill. Therefore, formal education plays a pivotal role in equipping students with the necessary skills to become autonomous learners. The components of learner autonomy accepted by advocates of autonomy entail learners taking initiative, monitoring progress, and evaluating individual learning outcomes (Benson, 2011). Autonomous learners employ cognitive, metacognitive, social, and affective strategies to manage their own learning.

In learning and teaching processes, all these dimensions are interwoven and closely related. Cognitive strategies relate to decision-making about one's own learning (e.g., knowing about alternatives); metacognitive strategies are used to manage learning (e.g., planning, monitoring, and evaluating the learning process); social strategies are implemented to learn through interaction and collaboration with others; and affective strategies consider one's own interests and motivation while carrying out learning tasks (Tassinari, 2012).

Despite the prevalence of learner autonomy in higher education, it has been unanimously recognized that developing learner autonomy does not entirely depend on the ubiquity of resources, tools, and environments for out-of-class learning but requires support to develop the skills and mind-set that can lead to successful autonomous learning (Benson, 2011). Although online educational technology has introduced unprecedented options for teaching and learning with opportunities for self-directed learning by enabling learners to use resources for learning on their own, in the Asian education context learner autonomy is still a new concept. Moreover, as Asian learners are often stereotyped as passive and reluctant to openly challenge teachers' authority (Chang & Geary, 2015), training learners to become autonomous could be difficult. For instance, several researchers examined the readiness of Asian learners for autonomous learning and their studies revealed that the learners did not possess the characteristic of learner autonomy such as learner control, ability to make decisions, the capacity to take responsibility for one's own learning, and skill to critically evaluate one's own progress (Doyle & Parrish, 2012; Guo, 2011). Similarly, in the Bhutanese context, until the introduction of modern education in the 1950s, the education system heavily relied on a traditional approach where passive reception and culture of reproduction were emphasized over active participation and creativity (Phuntsho, 2000). This conventional teacher-centred approach could be a hurdle for Bhutanese students to develop learner autonomy.

Thus, the current Learning by Doing pedagogy integrated reactive autonomy in its approach as teachers helped to formulate a direction of learning and students reacted by choosing preferred strategies, materials, and goals. Considering Bhutanese students' substantial dependence on teachers, reactive autonomy was suitable for them as the teacher could provide the support necessary for their learning.

Learning by Doing (LBD)

Learning by Doing refers to a theory of education postulated by American philosopher John Dewey (Garrison et al., 2012). It is an active, hands-on approach to learning that prioritizes practice over theory during the learning process. The goal of this teaching approach is for learners to take charge of their own learning through active participation. The curriculum is designed using a student-centred approach and it focuses more on "making, producing, practicing, and observing" rather than teacher-centred lectures (Churchill, 2003). This approach emerged from constructivist theory; thus, students' willingness and self- responsibilities are crucial for successful learning. While students take ownership of their learning, the teacher's role is to guide and facilitate the students by providing them with multiple tasks and teaching

materials. Hence, the learners construct knowledge and skills through the guidance of the teachers. Mekonnen's (2020) research on the effectiveness of Learning by Doing teaching strategy in Somaliland with undergraduate students indicated that Learning by Doing was useful as participants' responses demonstrated that the approach enhanced their active participation in the learning process, and helped to understand the course more. Some characteristics of the learning by doing approach are:

i. Learning as a process, not the end product;
ii. Learning is the process of creating knowledge;
iii. Learners work to create, interpret, and reorganize knowledge in individual ways;
iv. Less emphasis is placed on transmitting information and more on the development of students' skills;
v. Students are engaged in self-directed learning (e.g., monitoring, choosing preferred strategies and materials, and evaluating) with minimal intervention from teachers;
vi. Greater emphasis is placed on autonomous learning over teacher-directed lectures (Wrenn & Wrenn, 2009).

In the context of GCIT, the B.Sc. in Information Technology programme adopted the Learning by Doing pedagogy in Year I. The teaching-learning and assessment of each IT core module were completed within five weeks. The students were viewed as unique individuals and they engaged in completing a task available in the Virtual Learning Environment (VLE), a Moodle implementation, after one hour of the lecture by the module coordinator on a daily basis. The modules included a wide range of teaching-learning tasks divided into smaller learning activities for each unit to accomplish the overall objectives of the modules. The approach included a diverse range of teaching-learning components including lectures, activities, discussions, audio-visual materials, and projects. Students were seen learning by doing in these classes and they solved problems through hands-on approaches. With the implementation of Learning by Doing approach, it was, therefore, expected that students would acquire knowledge and skills to achieve the learning outcomes of the programme (Gyalpozhing College of Information Technology [GCIT], 2020).

Methodology

Research Design

The study employed a mixed-method, quasi-experimental design. Unlike a true experiment where participants are randomly assigned to treatment and control groups, in the current study, all the participants were selected based on the requirements of the study and treated as the treatment group. As experimental research seeks to determine if a specific intervention influences an outcome (Creswell, 2014, p.13), in the present study the one-group pretest-posttest design was implemented to determine whether there is a causal relationship between Learning by Doing (intervention) and degree of learner autonomy among first-year students (outcome). A pre-closed ended questionnaire was administered with a group of

respondents (01); treatment (X) then occurred; and a post-closed ended questionnaire with the same respondents (02) followed as illustrated in Table 1 below:

Table 1. Quasi-experimental Study

One Group Pretest-Posttest Design			
Group	Pre	Intervention	Post
A	**01**	**X**	**02**

Where,

A: Participants
01: Pre-closed ended questionnaire
02: Post-closed ended questionnaire
X: Treatment (Learning by Doing)

Participants

Sixty-two first-year students taking BSc in Information Technology at Gyalpozhing College of Information Technology in the first semester of the academic year 2021 participated in the study. To ensure participants' homogeneity, students who were taught using the Learning by Doing approach were selected.

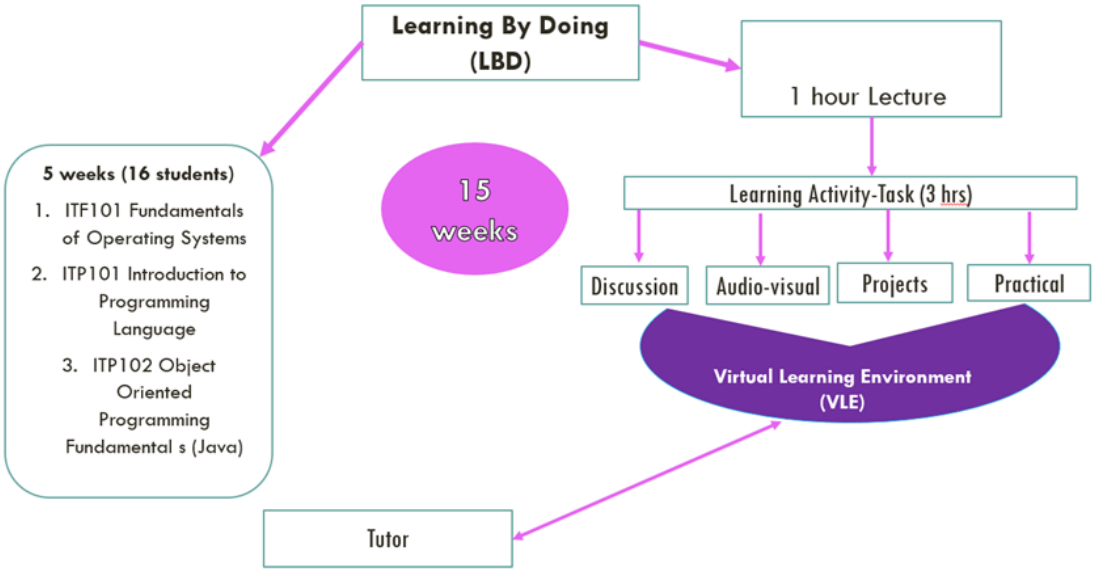
Intervention

Learning by Doing (LBD) was implemented as an intervention in this study over one semester. In a class, there were only 16 students. The activity-based learning provided individualized and self-directed instruction. Students were required to work on a series of activities that were designed to train them on certain skills, as described in the learning outcomes. The students submitted the deliverables of the activities within a day, which the tutors evaluated and provided feedback on. This mode of instruction strived to provide students with a platform for independent learning. The activity-based learning encompassed a wide range of teaching learning activities including lectures, activities and discussions, audio-visual engagement, hands-on practicals, and projects.

Each IT core module was taught over a period of 5 weeks sequentially. For instance, the first IT core module was taught, assessed, and completed within the first 5 weeks of the semester. Over the 5-week period, there was regularly a 1-hour lecture and 3 hours of practical sessions. Upon completion of the first module, the same process was then implemented for the next IT core module. Each activity was expected to contribute towards knowledge and understanding of the theory and development of skills related to the modules. The students were involved in summarizing and applying concepts, reviewing ideas, and developing programming skills through problem-solving, discussion forums, and quizzes. Once students completed the activities, they were assessed through assignments, conceptual tests, projects, presentations, practical tests, and final examinations.

Figure 1 below shows the process of implementation of LBD at GCIT.

Figure 1. GCIT Learning by Doing Process



Data Collection

Over one semester, quantitative data was collected using a pre-and post-closed ended questionnaire, and qualitative data through semi-structured interview.

Pre- and Post-Closed-Ended Questionnaire

A pre-and post-closed-ended questionnaire was administered using Google Forms before and after the intervention respectively to examine the degree of learner autonomy. This study adapted the Self-Efficacy Questionnaire of Language Learning Strategies (SEQueLLS) developed by Ruelens (2019). The questionnaire included two parts. The first part collected the participants' demographic information, including their gender, English language proficiency, and other related information. The second part consisted of 38 items investigating the participants' autonomous learning capacity based on seven common characteristics of learner autonomy: identifying learning needs and setting goals, selecting learning resources and materials, seeking social assistance, organizing the learning process and environment, monitoring one's learning, evaluating one's learning, and transferring acquired skills to other contexts. A five-point Likert scale was used to indicate the degree of agreement of respondents.

Semi-structured interview

As interviews provide researchers with rich and detailed qualitative data (Gillham, 2000), in this study, the researchers used the semi-structured interview to understand participants' attitudes and perceptions towards the use of Learning by Doing (LBD). The

researcher used the interview protocol constructed using the guidelines postulated by Creswell (2014), for asking questions and recording answers during the interview. The interview was conducted at the end of the semester and of 62 participants, 16 were randomly selected for the interview. Only 12 students turned up for the interview, and each interview lasted for 15-20 minutes.

Procedures

The following sequential procedures were implemented:

i. Researchers obtained consent from the participants by making the purpose, procedure, and requirements of the study clear and letting them sign the informed consent form.
ii. Researchers administered a pre-closed-ended questionnaire to determine the degree of learner autonomy of participants at the beginning of the course.
iii. Researchers administered the post-closed-ended questionnaire to check the degree of learner autonomy after one semester.
iv. Researchers conducted a semi-structured face-to-face interview with sample participants.
v. Finally, data was analysed by computing the pre-and post-closed-ended questionnaire data in Excel and using content analysis to organize the substantive themes of the semi-structured interview.

Results

This section presents the findings in alignment with the two research questions. It examined whether there was any statistically significant difference between the pre-and post-closed-ended questionnaire in terms of learner autonomy and scrutinized the perception of students about the Learning by Doing approach.

Quantitative Result

Effectiveness of Learning by Doing Approach to Improve Learner Autonomy

To examine whether there was a statistically significant difference between the pre-and post-mean in terms of learner autonomy, the data collected from pre-and post-closed-ended questionnaires was analysed.

As shown in Table 2, the paired-sample t-test suggested that the implementation of the Learning by Doing approach was effective in enhancing students' learner autonomy over the period of one semester. There were statistically significant differences in the mean scores of the pre-closed-ended questionnaire (x=3.55) and post-closed-ended questionnaire (x=4.16) responses of participants at $p=0.00<0.05$, indicating that the participants developed learner autonomy. The components such as identifying learning needs and setting goals (p=0.00), selecting learning resources and materials (p=0.00), seeking social assistance (p=0.04), organizing the learning process and environment (0.01), and transferring acquired skills or information to

other contexts (0.01) achieved a significant degree of difference between pre- and post-closed ended questionnaire scores at a level of 0.05. However, characteristics 5 and 6, monitoring one's learning (p=0.36) and evaluating one's learning (p=0.34) did not have a significant difference between pre and post-mean.

Table 2. Difference between Pre-and Post-closed-Ended Data

Characteristics	Mean (Pre)	SD (Pre)	Mean (Post)	SD (Post)	T - test
1. Identifying Learning Needs and Setting Goals	3.70	0.60	4.02	0.54	0.00
2. Selecting Learning Resources and Materials	3.43	0.62	3.71	0.59	0.00
3. Seeking Social Assistance	3.81	0.69	4.05	0.65	0.04
4. Organizing the Learning Process and Environment	3.50	0.53	3.30	0.61	0.01
5. Monitoring One's Learning	3.65	0.54	3.57	0.57	0.36
6. Evaluating One's Learning	3.34	0.52	3.42	0.54	0.34
7. Transferring Acquired Skills or Information to Other Contexts	3.42	0.63	3.66	0.51	0.01
Overall	3.55	0.41	4.16	0.51	0.00

Remark: ** significant at 0.05 level

Overall, the characteristic "Organizing the learning process and environment" is significant with a p-value of 0.01, so there is a difference in the student's opinion after going through the LBD intervention but the means for items such as setting realistic and achievable study plan and then sticking to the plan have decreased. More than half of the students are not sure about their ability in sticking to the study plan both before and after the intervention. This could be due to the student's inability to complete all the tasks during lab hours and time constraints for the module as reflected in Table 3.

Table 3. Organizing the Learning Process and Environment

Items	Mean (Pre)	Mean (Post)	SD (pre)	SD (post)	T - test
i) I set a realistic and achievable plan	3.63	3.54	0.78	0.74	0.49
ii) I stick to my study plan	3.17	2.94	0.81	0.87	0.08
iii) I organize my learning environment.	3.57	3.57	0.73	0.79	1
iv) I keep my learning space tidy.	3.74	3.8	0.72	0.80	0.48
v) I leave my smartphone off when studying	3.37	2.66	1.14	1.19	0.67
vi) I keep an appropriate learning pace.	3.54	3.28	0.83	0.91	0.01

In Table 4, the modal value of the pre and post-components suggest that more than half of the students agreed about monitoring their learning in terms of routine, progress, and process. However, there is a decrease in the mean of almost all the components with regard to monitoring one's learning after the Learning by Doing intervention, which demonstrates their incompetency in monitoring their learning while practicing self-directed learning. The overall p-value for monitoring one's learning is 0.36 which is insignificant and thereby rejected the hypothesis that there is a difference in the mean for pre and post-data with respect to monitoring one's learning.

Table 4. Monitoring One's Learning

Items	Mean (Pre)	Mean (Post)	SD (pre)	SD (post)	T-test
i) I reflect on whether the selected learning routine is effective.	3.66	3.57	0.76	0.79	0.48
ii) I follow my learning process to reach my learning goals.	3.69	3.59	0.74	0.71	0.40
iii) I monitor whether my learning is progressing according to my plan.	3.60	3.54	0.83	0.83	0.72
iv) I monitor whether I have achieved my learning goals after completing each task.	3.46	3.50	0.79	0.77	0.73
v) I check whether I have understood the previous lesson when I try to finish a task.	3.88	3.63	0.81	0.82	0.07

Table 5. Evaluating One's Learning

Items	Mean (Pre)	Mean (Post)	SD (pre)	SD (post)	T-test
i) I have a set of criteria to evaluate my learning outcome.	3.09	3.2	0.89	0.78	0.46
ii) I evaluate the quality of my learning outcome	3.32	3.50	0.81	0.63	0.12
iii) I seek help from my peers to evaluate my learning outcome	3.35	3.35	0.87	0.97	1
iv) I seek help from my professor to evaluate my learning outcome	3.15	3.07	0.95	0.98	0.62
v) I evaluate whether I reached my learning goals	3.35	3.55	0.84	0.71	0.18
vi) I evaluate whether my learning process was effective	3.67	3.6	0.72	0.77	0.52
vii) I evaluate whether my planning was realistic and achievable.	3.44	3.63	0.79	0.76	0.16

There is a slight increase in the mean of a few of the components with regard to the evaluation of one's learning which reflects students' ability in evaluating their learning routine, goals, progress, and verifying the lessons learned. The overall p-value for evaluating one's learning is 0.34 and thus the characteristic "Evaluating one's learning" is insignificant, as shown in Table 5. There is evidence that students were mostly taking a neutral stand when asked about their evaluation of learning outcomes using their set of criteria or with the lecturer's help. However, more than half of the students agreed that they do assess their own planning and learning process and also prefer peers to evaluate their learning outcomes.

Qualitative Result

Student's Perception of the Autonomous Learning Approach

At the end of the semester, a semi-structured interview was conducted with twelve participants to understand their attitudes and perceptions toward the use of the Learning by Doing (LBD) approach. The interview data is presented under two themes, namely, improved participation in the learning process and challenges of autonomous learning as detailed below:

Improved Participation in the Learning Process

All twelve interviewees had some knowledge about the autonomous learning approach. The participants shared their definitions of autonomous learning and experiences of learning on their own. Following are the responses provided by students:

> Student 8: Independent learning means, researching on your own, you will be given a topic/concept and you have to search/explore it on your own. And students work more on their own thereby increasing student's ability to learn more.
>
> Student 7: It helped us to explore more on our own, we became independent while learning by ourselves. We don't have to rely on others and we get many resources online while we learn by ourselves.
>
> Student 10: I thought learning by doing was good because we are learning it ourselves especially learning programming languages such as Python, we learn when we study on our own. We work in the lab on our own and when we get errors we continue working and we understand.

Overall, students had a positive experience with Learning by Doing pedagogy and the interview findings revealed that there was an improvement in students' participation in the teaching-learning process. Majority of students reported that the LBD tasks kept them motivated throughout the semester and enhanced their ability to select learning resources and materials, seek help from classmates and tutors, and take responsibility for their own learning. The participants shared how LBD benefitted them. To represent others' views, Student 7 expressed:

> Yes it helped, in LBD class, after 1 hour of lecture, 3 hours was given for practical, so we could explore on our own. We could do practical on our own, and when we don't know we asked for help from our friends and tutors, if not search on YouTube.

Challenges of Autonomous Learning

Autonomous learning invariably requires students to have a degree of self-discipline and self-motivation. Despite the positive impact of LBD on the learning process, majority of students unanimously expressed their discontentment over the allocation of time for completing each module. To corroborate this view, Student 11 said that "the problem with the LBD is the time span, so it is like 20 days, and to learn a programming language it takes more than years and here we learn it within 20 days".

Moreover, some students found completing the course syllabus demanding because of the vastness of the content. Students, for example, acknowledged the difficulty of fulfilling the daily requirements of the course, as expressed by Student 4:

> It is interesting, but also hectic. We have one hour lecture, and 3 hours of practical, to explore, use the learning materials provided by the tutors, and watch the videos. We cannot explore everything within three hours as the unit itself is vast and it gets hectic.

Furthermore, monitoring and selecting one's learning is a vital component of autonomous learning, however, the interview findings indicated that many students did not have adequate skills to monitor their learning and felt incompetent to evaluate their own learning.

It can be inferred from participants' interview responses that there is a heavy reliance on teachers for monitoring and evaluating the learning progress. The findings showed that teacher scaffolding gave students guidance and motivation to understand the learning material and steps to complete the task on their own. The following excerpts demonstrate student's need for teacher support and guidance:

> We need teachers, if I give a current example, let's say we are studying programming language, if we study on our own, we won't know where to start and when to end. For example in the case of Python, we won't know the syntax, so a one-hour theory class teaches us the starting point. But when we study without any guidance we won't know when to stop (Student 4).

Similar views were expressed by Student 9: "I think it is nearly mid-level like we need teachers' help and some concepts may need more of our effort but I think we need teachers' help the most. Like teachers can teach us the rules and the general idea but logic, we have to understand ourselves, we have to search and analyse for ourselves."

Discussion

The current study evaluated the degree of autonomous learning of first-year students after the intervention of the Learning by Doing (LBD) pedagogy. Firstly, the findings supported the conclusion of the previous study on using Learning by Doing as a teaching strategy to enhance students' learner autonomy (Mekonnen, 2020). Overall, the findings of the closed-ended questionnaire and interview revealed that the participants developed learner autonomy after undergoing LBD for one semester. Students improved their ability in identifying learning needs and setting goals, selecting learning resources and materials, seeking social assistance, and transferring acquired skills or information to other contexts after the intervention. However, the statistical finding showed that their ability to organize the learning process deteriorated after the intervention. This could be because of the student's inability to complete all the tasks during the allotted lab hours. The time limit of 25 days to complete each module might have impeded autonomous learning as they were not able to acquire the required knowledge on a daily basis. This finding echoed the result of the study conducted by Bonk et al. (2014) which suggested that the common reason for self-directed learning included intrinsic motivation with lack of time being the substantial impediment to using the resource.

The findings from the study also showed that students expected tutors to help them with monitoring and evaluating their learning progress. The components such as monitoring and evaluating learning progress had insignificant improvement and this was further corroborated by interview findings (Section 5.2.2, Interview Student 4). The previous studies supported this finding as teacher's guidance, feedback, and roles were identified as a pivotal attributes in the development of students' autonomous learning (Kim, 2014; Lee, 2016). To foster learner autonomy, the teachers were expected to facilitate, monitor, and evaluate the students learning process. One positive impact of the intervention was the increase in the number of students using gadgets such as laptops and phones for exploration and research of complex topics on the internet.

Secondly, the result confirmed Gyamtsho and Maxwell's (2012) research in which they identified historical-cultural as one of the factors affecting teaching and learning in the Bhutanese education system. Before the introduction of modern education, monastic education was predominant in Bhutan. As the learning approach was traditionally teacher-centred and dependent on rote learning and memorization based on the key textbooks, the students in the current study expressed their difficulty in adopting and adapting to a self-directed or autonomous learning approach. For instance, while learning programming module, it is mandatory that students understand the topic they are studying before moving to the next concept, however, students shared having difficulty organizing the learning process and environment which resulted in failure to complete all the tasks assigned on the day. The interview findings indicated that students needed tutors to take the facilitative role in continually monitoring their learning progress (Section 5.2.2, Interview Student 9) proving heavy dependence on the teacher-centeredness approach (Kim, 2014).

Lastly, the students did not necessarily know how to learn efficiently on their own at the beginning of the semester. The finding attested to the fact that the tutor was one essential attribute of learner autonomy (Anderson, 2011; Kim, 2014) and their presence was vital for motivating students. Apart from selecting learning strategies, materials, and goals to achieve learning objectives, students expected the tutor to guide and facilitate the learning process when needed. Furthermore, time constraint has been a recurring theme in this study. Students reported that they spent a great deal of time reading new materials and watching tutorials which made completing the tasks and assignments arduous on daily basis. Thus, it can be iterated that self-regulation and self-monitoring strategies are pivotal to the success of autonomous learning. It would be particularly helpful to teach management skills, such as deciding what, when, and how to learn, and how to monitor one's learning to become autonomous (Lee, 2016).

Conclusion

This paper investigated the degree of learner autonomy among first-year students of Gyalpozhing College of Information Technology (GCIT) who were taught using the 'Learning by Doing' approach. Findings from the statistical analysis and themes that emerged from the semi-structured interview indicated that students are ready for an autonomous learning approach. As suggested by a significant difference in the overall average mean, students seem to be embracing the idea of autonomous learning. Nevertheless, students need to work on their monitoring and evaluation skills to become fully autonomous. The Learning by Doing approach played a vital role in instilling the concept of independent or self-directed learning among students.

The current study considered all the participants as an experimental group, having a control group might have offered a wider perspective on the effectiveness of LBD in developing students' learner autonomy. Despite this limitation, the results from this study unveiled the probable benefits of using a student-centred approach such as LBD in enhancing learner autonomy among university students. Thus, it is recommended that teachers use innovative pedagogical tools to facilitate self-directed learning and support students in monitoring and evaluating their learning progress to realize the full potential of learner autonomy.

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