LEADERSHIP AND COOPERATIVE LEARNING AND ITS RELATION TOWARDS STUDENTS' GRADE ACHIEVEMENT IN PROBLEM-BASED LEARNING ENVIRONMENT

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ABSTRACT: The main objective of the paper is to obtain the outcome of relationship between students' perception of peers' leadership skill and cooperative learning with the final grade achievement in a Physics course. An established of problem-based learning (PBL) approach was set in an independent environment of learning process. The study involved students who registered under Physics with Electronics Programme. Data was gathered from an open-ended survey after the students finished with the PBL assessments towards the final week and the grade from their final exam as well. The open-ended surveys allowed the students to give their genuine perception of peers' performance in terms of leadership and cooperation. The analysis data was done using SPSS Version 22 using the Spearman correlation for non-parametric data. The finding of the report showed positive significant correlation between good leadership with higher final grade of exam. However the relation did not surface any significant relations for cooperative learning as students who performed better in exam not necessarily cooperating better in their teamwork.

Keywords: Problem-based learning; leadership; cooperative.

INTRODUCTION

Leadership is defining as the action of leading a group of people or an organization, or the ability to do this (Google, 2015). Whereas leadership skill is meaning as an effective communicator, emotionally intelligent and able to work across cultures; is socially responsible, competitive, resilient, and confident (MBE, 2015). In National University of Singapore, NUS (2015) a leadership programme is offered to help transform competent managers into great leaders. From learning to lead a team for the first time and negotiating for success, to gaining influence, inspiring commitment and leading transformational change across an organization. Their objective is help to expand candidates' leadership potential and grow as a leader. In Malaysia, the Ministry of Education has sets ten (10) shifts that must be emphasised in Higher Learning Institution. One of the aspiration for higher learning institution is to polish leadership skills amongst student upon graduating. This to ensure graduate students has quality and competence enough when working in more challenging world. One of the shifts is that graduate student should have attribute as a leader that may lead and arrange staff as in a group or in an organisation. In other literature, the needs to reform educational curriculum to be more focus in leadership development is important as it will contribute to produce more school leaders that met the requirement of challenging globalisation process (Hallinger & Kantamara, 2001). Bridges and Hallinger, (1997) came with an idea that in order to develop leadership within student, current curriculum can be incorporated with certain learning approach (e.g., problem-based learning). They also stress that PBL is an innovative learning-centered approach to leadership development.

Bridges and Hallinger (1997) in their work try to encourage leadership skill amongst students by implementing PBL in an innovative learning approach. They suggest that leadership education can be thought meaningfully and relevant compare to traditional ways, in addition PBL might arouses a high level of motivation amongst students. Motivate learners or students, namely active roles of students, high level of peer interaction, emphasis on higher order thinking skills and simulations are all under PBL attribute (Good & Brophy, 1991).

Whilst cooperative is defining as the process of working together to the same end (Google, 2015). Same as leadership, there are literatures that try to incorporate cooperative learning with problem-based learning (PBL). As discussed by Mohd Yusoff *et al*., (2011), integrating cooperative learning with PBL is critical when it comes handling a large class, for example, monitoring a small group

consist of 3-5 students of a total 60 students was a challenge. By integrating cooperative learning with PBL it is to be hope that might surface students' cooperative attribute to encourage students' skills development of content knowledge and related skills (Davidson & Major, 2014).

Problem-Based Learning Assessment

In this study, Problem-based learning (PBL) as an established approach was implemented in a Physics course. The course is Physics Thermodynamics (coded as SF20503) during Semester I, 2014/2015 academic session.

PBL originated in the field of medical school education as a method of instruction and a way of organising the curriculum for preparing future physicians (Barrows & Tamblyn, 1980). It's a student-centred instructional approach in which students collaboratively solve problems, and reflect on their experience and practical knowledge. Characteristics of PBL are where learning is driven by challenging and open-ended problems. Students work in small collaborative groups, and lecturers or teachers take on the role as 'facilitators' of learning. Accordingly, students are encouraged to take responsibility for their group, organise and direct the learning process with support from a tutor or instructor (Albanese & Mitchell, 1993; Colliver, 1993; Finucane, Johnson, & Prideaux, 1998; Gallagher, 1997; Lim, 2005). PBL approaches involve confronting situations where students are uncertain about information and solutions, and mastering the art of the instinctive leap in the process of resolving these situations (Boud & Felleti, 1991). Learning thus occurs through the application of knowledge and skills to the solution of authentic problems, often in the context of real practice (Bligh, 1995). PBL is a form of situated learning, and learning occurs through goal-directed activity situated in circumstances that are authentic in terms of intended application of the learnt knowledge. Advocates of PBL claim it can be used to enhance content knowledge and foster the development of communication, problem-solving, and self-directed learning skills. It is also an instructional method of hands-on, active, learning-centred education involving the investigation and resolution of messy, ill, loosely-structured problems, that one can find in real-world situations (Ahlfeldt, Mehta, & Sellnow, 2005; Paget, 2004). One advantage of PBL is that discussion in a small group will empower students to be more independent in their study. Which means they will stimulate themselves to be more responsible and directly lead them to spend more time on their studies.

In this study, a model based on a combination of three models was employed: model that used by McMaster University (Barrows & Tamblyn, 1980); the Torp and Sage Model (Illinois Mathematics and Science Academy (IMSA), 1998); and the model used by Pastirik (2006) The main purpose of choosing a hybrid model was to ensure students explores their own learning, especially in terms sharpening their analytical skills, improving their critical justification in making decision, being a creative observer, and practicing their communication skills. All of these characteristics can be sharpened through these established learning models. Thus these PBL models were modified to suit undergraduate students particularly in UMS itself.

There are five main stages that consist in this PBL which are: i. Problem presented; defined the problems which is ill-structure and complex situation; ii. Student recognises learning issues and potential sources of knowledge and information; iii. Engage in independent study by gathering and analysing essential scenario information; iv. Student then meet with the small group, they critically discuss the practical application of the information to the scenario; and v. Student then critically reflect on both the content learned and the process.

In PBL, the choice of assessment(s) implemented within a PBL curriculum has a powerful impact on student learning – when used effectively, assessment can promote and optimise student capabilities; when used unsuccessfully it can disempower students, undervaluing them and their work (Pettigrew *et al*., 2012). Pettigrew *et al*. (2012) suggests a varies of assessment can be done within PBL approach that will maximise students competency such as case-based essays, written examination, concept maps, *Viva voce*, Triple Jump, written examinations, written reports, role plays, online “chat” forum, independent study report, Reference list oral representation, reflective journal and portfolio. Thus in this study, assessment were rearranged from previous research and were to fit to local context.

METHODOLOGY

An established problem-based learning (PBL) approach was set in an independent environment of learning process. The study was carried out in Faculty of Science and Natural Resources (*Fakulti Sains dan Sumber Alam*, FSSA), Universiti Malaysia Sabah involving students who registered under Physics with Electronics Programme, Semester I, Session 2014/2015. Data was gathered from an open-ended survey after the students finished with the PBL assessments towards the final week

and the grade from their final exam as well. The open-ended survey allowed the students to give their genuine perception of peers' performance in terms of leadership and cooperative learning. The course involve is Thermodynamics encoded with SF20503 with three credit hours per semester.

Figure 1 shows the learning acquisition process. During the process students were exposed with an established Problem-Based Learning (PBL) approach. In PBL, knowledge acquisition activities were varies starting from choosing their own issue, continuous evaluation, journal, discussion (online and offline), presentations (i.e., presentation I and II) and final report. These type of assessments were categorised under constructivist approach.

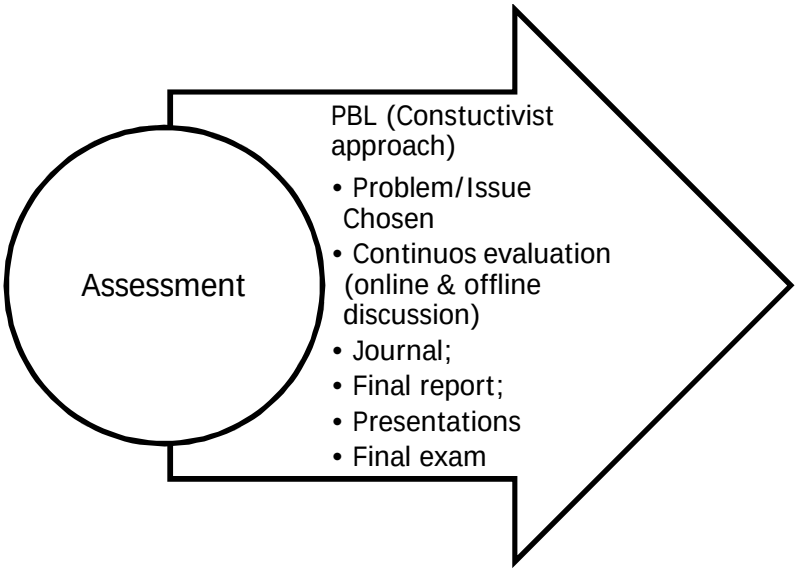

Figure 1 Learning acquisition process in this study.

Throughout the learning process team member in every group will be able to know their peers better and this will assist them to observe and monitor indirectly their peers' performance. After completing with the final assessment, each team member need to fill in an open ended survey. In this particular survey they need to evaluate their peers' performance and attitude in term of leadership and cooperative through out the semester. The final output of this open ended survey will be correlated with another dependent variable which is their final grade in their final exam. These data then will be analysed using Spearsmen correlation analysis. The objective is to monitor

and to observe is there any positive correlation between student who showed good leadership skill and fully cooperative during their assessment accomplishment process with better grade achievement. The analysis was done using The SPSS Version 22.

FINDINGS

Table 1: Spearsman Correlations

			Leadership	Cooperative	Grade
Spearman's rho	Leadership	Correlation Coefficient	1.000	.114	*.507***
		Sig. (2-tailed)	.	.429	.000
		N	50	50	50
	Cooperative	Correlation Coefficient	.114	1.000	.258
		Sig. (2-tailed)	.429	.	.070
		N	50	50	50
	Grade	Correlation Coefficient	*.507***	.258	1.000
		Sig. (2-tailed)	.000	.070	.
		N	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

When it come to transcribing the open-ended surveys, the MAXQDA software was used to analyse the output qualitatively. The output of the open ended survey for leadership can be categorised into three (3) main themes which are: 1. showed good leadership skills, 2: skill of leadership can be nurtured/developed; 3. can't be a leader. Same goes for cooperative variable, where the themes can be separated into three (3) main outputs: 1. Fully cooperative; 2: Cooperative attribute can be developed; 3: very uncooperative.

The finding of the study shows positive correlation exist between good leadership skills with the grade of final exam in significant way ($p<0.01$) where the correlation coefficient was 0.507^{**}. However the relation does not surfaces any strong positive relations for cooperative as students who performed better in exam not necessarily cooperating better in their teamwork where correlation coefficient was only noted as 0.258.

DISCUSSION AND CONCLUSION

In Malaysia Education Blueprint (2015-2025) leadership skill is an attribute that has been stresses a lot. It should be nurtured amongst students in higher learning institution in order for us to face more challenging world towards "Wawasan 2020". Thus in preparing our younger generation, assessment that we are giving to students need to be more holistic and can really challenge the way their thinking and addressing problem properly rather that just giving traditional paper-pen based examination without digging up their true potential. Bridges and Hallinger (1997) stress that students will not develop their leadership attribute only by reading and discussing the leadership in theories. They should develop leadership attitude by experience in what leaders actually do and what it feels like to be a leader. PBL as an established approach, has offered the approach to reforming leadership skill within students (Bridges & Hallinger, 1997).

One advantage of PBL is that discussion in a small group will empower students to be more independent in their study. Which means they will stimulate themselves to be more responsible and directly lead them to spend more time on their studies (Dolmans et al., 2016). They added, student will feel uncomfortable if they didn't prepare anything before discussion or meeting, thus this will lead them indirectly to be more responsible to their knowledge acquisition thus leadership in them self can be slowly develop from here.

Kaufmann and Mann (2006) suggest that PBL curriculum is designed to assist students to develop their skills in communicating and working cooperatively with peers'. They added, those who aren't really contribute an participating enough in PBL assessment will lead to poor performance in their final grade achievement. Although this not really in line with the finding of this study, it is believed that positive feedback of cooperative attributes regardless to students' grade achieving is because the bonding that developed amongst peers. Students felt all of their peers are giving attention fully and cooperatively responded to every task that been given. This also in line with Roland's (2007) works where open communication is vital in order to develop leadership skill among workers.

With this it is to be hoped that one of the ten shifts which is to produce holistic and balanced graduates can be fulfilled as stated in the Malaysian Education Blueprint (2015-2025).

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