

Cooperative learning and generic skills among University students: A comparison between Diploma and Bachelor Degree students.

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Abstract

Lack of generic skills has been found to be one of the factors of unemployment among university students. Because of this many universities have revised their curriculum in order to include the development of generic skills among students. One such method that has been utilized by lecturers in teaching and learning is cooperative learning. Previous research has shown that cooperative learning can be used as an instructional strategy at the university to improve students' generic skills. The question the authors are interested in is to what extent does cooperative learning improve generic skills in students. Two groups of students are used in this quasi experiment; a group of 24 students after SPM who enrolled in one of the Diploma courses and a group of 58 students after Matriculations or Diploma who are enrolled in one of Bachelor Engineering courses in Universiti Tun Hussein Onn Malaysia, Johor. The purpose of this study is to determine how much generic skill is achieved by this group of students after going through 8 weeks of cooperative learning. A questionnaire consisting of 54 questions comprising eight generic skills: collecting, analyzing and organizing information; communicating ideas and information; planning and organizing activities; working with others and in teams; using mathematical ideas and techniques; solving problems; using technology and cultural understandings was used as the instrument. The data obtained is analyzed by means of descriptive data and inferential statistics. The means and percentages were used to report gender and age data while the paired t-test was used to identify and analyze the differences of students' generic skills before and after attending the cooperative learning classes with 0.05 significant levels. Results shows that there is a significant improvement in generic skills in four areas in the group of Diploma students but no significant improvement in generic skills in all the area measured for the Bachelor of Engineering group. Thus, generic skills inculcation in the earlier part of tertiary education is more significant rather than at a later stage..

Keywords: generic skills; cooperative learning; University students

1. Introduction

The issue of unemployment among University graduates has caused a major concern and interest to a lot of people. A University degree that has been perceived as a passport to employment, good paying job and a successful career is no longer so, as there is a rise in unemployment among University graduates. According to Ministry of Human Resource (2006), among the unemployed, 24.3% are in the tertiary education level. Among the reasons why many employers are reluctant to employ fresh graduates because they have poor command in English language (55.8%), poor character, attitude or personality (37.4 %), asking for unrealistic salary/benefits (33.0%), mismatch of skill (30.2%), no demonstrated ability to solve problems (25.9 %) and skills knowledge not in-depth enough (23.8%) (Jobstreet.com/ NST, Friday July 10, 2009). Many of the unemployed graduates are those who have a low

proficiency in generic skills, especially the communication skill (Soo, 2007; Pauw, Oosthuizen & Westhuizen 2006). As the results, they are not able to adapt with the workplace environment and this will affect their productivity level..

There is a high demand for generic skills in the workplace. Employers need workers who are reliable, responsible workers who can solve problems and who have the social skills and attitudes to work together with workers. Known by several names such as key skills, core skills, essential, skills, key competencies, necessary skills, transferable skills and employability skills, generic skills are skills that that apply across a variety of jobs and life context (Australian National Authority, 2003). Generic skills such as creativity, innovativeness, problem solving, ICT, analytical, numeracy and entrepreneurship thinking are becoming important factors in discriminating successful and non successful

graduates in the job market (Annie, Muk-Ngiik Wong, Hamali & Jamil, 2006).

In order for graduates to be marketable and not being left out from the labor force participation many initiatives have been done by the universities to improve their curricula to meet the demand of today's industry. Curriculum has been revised to help students to become 'work ready' in terms of their generic skills development by including this component in the curricula. In addition, university lecturers used various teaching and learning approaches in order to incorporate generic skills in them.

One such method that has been utilized by lecturers in teaching and learning to improve generic skills is cooperative learning. Cooperative learning is an instructional paradigm which utilizes small groups so that students work together to maximize their own and each other's learning. The essential components of cooperation are positive interdependence, face-to-face interaction, individual and group accountability, interpersonal and small group skills, and regular self-assessment of team functioning (Johnson, Johnson, & Holubec, 1993). The basic principle of cooperative learning does not change, although teachers/lecturers may use a specific model lecturers/teachers to set up cooperative learning groups and to structure lesson. Some of the variations include Learning Together, Circles of Learning, Jigsaw, Student Team-Achievement, Team Game Tournaments, Group Investigation, Team Accelerated Instruction and Cooperative Reading and Composition.

The effect of using cooperative learning in teaching and learning has been positive for all types of students. For example, cooperative learning has been shown to increase retention and boost the performance of at-risk students (Gehring; 2006), improved University student academic performance (Gonzalez, 2006; Chemwei, Kiboss, & Ilieva, 2005), promote higher achievement and greater retention than do individualistic learning experience for all students (Stevens & Slavin, 1995), increases in self-esteem, social acceptance, and teacher ratings of students with disabilities (Putnam, Markovchick, Johnson, & Johnson, 1996), and guide and shape student behavior (Johnson & Johnson, 1975). Previous studies by Ballantine & Larres (2007); Awang, (2006); and Tiat et al(2001) shows an improvement of generic skills among students when cooperative learning is incorporated in their lesson. If generic skills among students can be improved, the authors are interested to investigate to what extent does cooperative learning improved generic skills in students. Two groups of students are compared in this study, the Diploma Students and the Bachelor Students.

The purpose of this study is to determine the effect of cooperative learning on university's student generic skill. In order to achieve this, the following research questions are formulated.

1) What is the level of students' generic skill before and after cooperative learning is introduced?

2) Is there a statistically significant improvement in the level of generic skills among students after using cooperative learning?

This study is significant as it adds to the body of literature on the effect of cooperative learning on generic skill, especially in higher education. It also helps to encourage lecturers to use cooperative learning in their teaching and learning if the results show a positive effect.

2. Methodology

This is a quantitative research which utilizes a quasi-experimental research design whereby a pre-test/post-test is used, with individual as his or her own comparison. In this case, the effect of cooperative learning on university's student generic skill is determined by comparing the level of student's generic skill before and after the treatment using the same measure. In order to validate if the treatment has been given appropriately, the authors observed the classes to make sure cooperative learning is conducted properly.

2.1. Sample

For this study we are using an intact sample where no random sampling is involved. The sample consists of two classes: a class of 24 students from Diploma in Information Program who are undertaking a DIT 1073 Mathematic II and a class of 58 students from Bachelor of Mechanical Engineering Program who are undertaking BDA 3083 Engineering Design I. The Diploma students use Student Team Achievement Division technique while the Bachelor students use Group Investigation. The profile of the sample composition is shown in Table 1.

Table 1: Profile of respondents

		DIT 1073		BDA 3083	
		<i>f</i>	%	<i>f</i>	%
Gender	Male	7	29.2	33	56.9
	Female	17	70.8	25	56.9
	Total	24	100	58	100
Age	<22yrs	16	66.7	0	0
	22-24	7	29.2	51	87.9
	>24yrs	1	4.2	7	12.1
	Total	24	100	58	100

f = Frequency % = Percentage

2.2. Instrument

The study uses a set of questionnaires to determine the level of generic skills as the instrument to collect data. This questionnaire consists of two parts: respondent demography such as gender, age, and student's matrix number; and measurement of

the seven generic skills based on Mayer Key and one Post Mayer addition. The generic skills form a firm foundation for the identification of skills required to successfully participate in the world of work (Australian Education Council and Ministers of Vocational Education, Employment and Training, 1992). Seven skills from Mayer's key competencies and one post-Mayer addition (Curtis and McKenzie (2001)) are used as variables to measure the generic skills in this study. The generic skills measured are collecting, analyzing, and organizing information; communicating ideas and information; planning and organizing activities; working with others in team; solving problems; using mathematical ideas and techniques; using technology; and with the Post-Mayer addition cultural understandings. These skills are required by both new and existing employees to work successfully in organizations. The students are required to assess themselves on the scale of 1 to 5, 1 being strongly disagree and 5 being strongly agree on the skills. There are forty eight questions, seven for each generic skills measured. This instrument was validated by for its readability, item chosen, etc. In addition, the instrument is also tested for its reliability by using the alpha cronbach test. A 0.918 alpha value is obtained from the test.

2.3. Procedure

At the start of this experiment both group of students were given a questionnaire as a pre-test to determine their level of generic skills. Both group of students were given a "treatment" whereby Diploma students were treated with cooperative learning using a technique called Students Team Achievement Divisions (STAD), while the Bachelor students were treated with Group Investigation. After a period of eight weeks they were given a post-test (the same questionnaire as before) to determine their level of generic skills.

The Diploma students uses the Student Team achievement Divisions (STAD) (Slavin, 1978) approach which is developed by Robert Slavin. STAD is a simple team technique in which students in a given class are assigned to four-or-five heterogeneous member learning team. These students were given a different role within the group such as a leader, assistant leader, recorder, resource manager, and time keeper. The students will stay in the same group until the course is over. The structured activity begins after the lecturer/teacher delivers a lecture in class, after which it is follow with assignment given and this is done in groups.

The lecturer incorporates STAD in the tutorial session. Assignments from topics that were taught that week were given to students during this session, and they were given forty minutes to complete the assignment. The students were allowed to discuss and solve the problem in groups. After every topic a quiz was given for students to be done individually. However, whatever their grades will

contribute marks towards the score of group work. This will encourage the students to work harder because they are responsible for their group work score. In order to motivate the students to work harder, the lecture give a reward to the group based on the highest total score achieved by students on group work.

The Bachelor Students uses Group Investigations developed by Sharan & Sharan in the 1970's. In group investigation students collaborate to produce a group product for presentation. This is an open-ended investigation which students may help determine the focus of their investigation. The activity is structured to emphasize higher-order thinking skills.

The lecturer incorporates Group Investigation in the Laboratory Session. In the Laboratory the students were given assignment where they were required to work in groups to complete several design projects. In this case, students are assigned topic for investigation. The students will divide the investigation into smaller parts, and each is responsible for researching one of the subtopics. They will come together as a group and share their information. Students synthesize information to produce an end product. Each group member participates in the class presentation. The winner of the group project will be given an award by the lecturer as a motivation for them to work their best.

3. Results

Results from this study show an interesting insight on effects of cooperative learning on generic skills on both Diploma and Bachelor students. Age and educational background are the two factors that distinguished between the two groups. Following are the results from the two research questions.

3.1. What is the level of students' generic skill before and after cooperative learning is introduced?

For the Diploma students, the level of generic skills before cooperative learning ranges from mean of 2.87 to mean of 3.75. However, after cooperative learning incorporating in the teaching and learning process the level of generic skills ranges from mean of 3.31 to mean of 3.75. In general we can say that there is an improvement in the mean score from before cooperative learning is introduced and after the cooperative learning is introduced for the Diploma students. Table 2 shows the level of students' generic skill for the Diploma students.

For Bachelor students, the level of generic skills before cooperative learning ranges from mean of 3.05 to mean of 3.94. However, after cooperative learning incorporating in the teaching and learning process the level of generic skills ranges from mean of 3.11 to mean of 3.94. In general we can say that there is not much improvement in the mean score from before cooperative learning is introduced and

after the cooperative learning is introduced for the Bachelor students when we compare it with the

Table 2: Level of generic skills for DIT 1073

Generic Skills	Before CL		After CL	
	Mean	SD	Mean	SD
1. Communicating ideas and information	2.87	0.54	3.29	0.52
2. Working with organising activities	3.12	0.66	3.31	0.62
3. Solving problems	2.880	.50	3.33	.37
4. Collecting, analysing and organising information	3.63	0.60	3.79	0.39
5. Planning and organising activities	3.14	0.77	3.50	0.73
6. Using mathematical ideas and techniques	3.53	0.65	3.84	0.59
7. Using technology	3.42	.64	3.67	0.65
8. Cultural understanding	3.75	.76	3.96	0.61

Table 3: Level of generic skills for BDA 3083

Generic Skills	Before CL		After CL	
	Mean	SD	Mean	SD
1. Communicating ideas and information	3.05	0.55	3.11	0.79
2. Working with organising activities	3.37	0.49	3.37	0.49
3. Solving problems	3.33	0.58	3.37	0.82
4. Collecting, analysing and organising information	3.71	0.51	3.79	0.82
5. Planning and organising activities	3.47	0.66	3.87	0.72
6. Using mathematical ideas and techniques	3.89	0.72	3.94	0.94
7. Using technology	3.59	0.69	3.55	0.86
8. Cultural understanding	3.94	0.78	3.93	0.90

3.2 Is there a statistically significant improvement in the level of generic skills among students after using cooperative learning?

This was hypothesized as in H1: There is a statistically significant improvement in level of generic skill among students after using cooperative learning.

Using paired T-test, it is found that only four elements are found to be statistically significant for the Diploma students. They are communicating ideas and information, problem solving, planning and organizing activities and using mathematical ideas and techniques. Table 4 shows the level of students' generic skill before and after cooperative learning.

However, for the Bachelor students, although there is some improvement in some areas after using cooperative learning, the results shows that overall there is no statistically significant in the

Diploma students. Table 3 shows the level of students' generic skill for the Bachelor students.

improvement of generic skills among students after using cooperative learning. Table 5 shows the level of students' generic skill before and after cooperative learning.

Table 4: Level of generic skills before and after cooperative learning is introduced to DIT 1073

	Pre test Mean	Post test mean	t	Sig. $\alpha=0.05$
1. Communicating ideas and information	2.87	3.29	-3.370	0.003*
2. Working with organising activities	3.12	3.31	-1.927	0.066
3. Solving problems	2.880	3.33	-4.592	0.000*
4. Collecting, analysing and organising information	3.63	3.79	-1.476	0.154
5. Planning and organising activities	3.14	3.50	-2.310	0.030*
6. Using mathematical ideas and techniques	3.53	3.84	-2.790	0.010*
7. Using technology	3.42	3.67	-1.958	0.062
8. Cultural understanding	3.75	3.96	-1.735	0.096

Table 5: Level of generic skills before and after cooperative learning is introduced to BDA 3083

	Pre test Mean	Post test mean	t	Sig. $\alpha=0.05$
1. Communicating ideas and information	3.05	3.11	-0.067	0.480
2. Working with organising activities	3.37	3.37	-0.008	0.942
3. Solving problems	3.33	3.37	-0.038	0.751
4. Collecting, analysing and organising information	3.71	3.79	-0.078	0.534
5. Planning and organising activities	3.47	3.87	0.028	0.820
6. Using mathematical ideas and techniques	3.89	3.94	-0.059	0.649
7. Using technology	3.59	3.55	0.043	0.723
8. Cultural understanding	3.94	3.93	0.011	0.909

4.0 Discussion

It is hardly surprising that there is a difference in the initial level of generic skills for Diploma students and Bachelor students. The Diploma students has a lower level of generic skills in all the areas measured compared with the Bachelor students. This is because these Diploma students, majority aged less than 22 of age have educational background of Sijil Pelajaran Malaysia (SPM) as compared to Bachelor students who mostly are

above 22 of ages whose educational background prior to this are matriculation, diploma, and Sijil Tinggi Pelajaran Malaysia (STPM), has less experience using these generic skills when compared to Bachelor students. Generic skills can be taught, and it is best to teach generic skills at an earlier age. Failure to equip young people with the generic skills or job readiness skills critical to job success is equivalent to placing employability barriers in their path. Allowing students to graduate with these deficiencies will cause unemployment among University graduates.

Globalization and advancement in technology demand superior quality of workforce. Workers of today require not only require having good technical skills but also need to master generic skills to complement the current industrial needs. University needs need to churn out graduates that can fulfil the needs of industry or else their graduates will be left out and unemployed. This is because service sector has been progressively replacing the manufacturing sector. The services sector expected their workers to not only possess the right technical knowledge, but also those who possess the right generic skills.

Although for both Diploma and Bachelor students there is some improvement in the level of generic after the generic skills is incorporated in their teaching and learning, results show that only four elements are found to be statistically significant for the Diploma students. They are communicating ideas and information, problem solving, planning and organizing activities and using mathematical ideas and techniques. For the Bachelor students, however, the results show that there is no statistically significant in the improvement of generic skills among students after using cooperative learning.

Bachelor students begins with having a higher level of generic skills, with mean ranges from 3.05 to 3.94 (from the scale of 1 to 5), when compared to Diploma students who begins with mean ranges from 2.87 to 3.75. When you start with a high number, a little improvement would not register a statistically significant difference. Skills after a while, plateaus, although much effort is done to try to improve it. Perhaps for this group of Bachelor students their generic skills has reached to their maximum potential or perhaps cooperative learning might not the tool to improve generic skills at this stage.

But for Diploma students, their starting level of generic skills is lower, thus the results shows a statistically significant improvement in their generic skills, especially in the four areas measured: communicating ideas and information, problem solving, planning and organizing activities and using mathematical ideas and techniques. These four areas are something that the Diploma students are having lack of experience prior using cooperative learning.

5.0 Conclusion

Cooperative learning can be used by almost any teachers/lecturers as it can be adapted to match their teaching philosophies and practices. This is because cooperative learning is a general term that refers to numerous methods for organizing and conducting classroom instruction. Students will benefit more if teachers/lecturers uses numerous methods in organizing and conducting classroom instruction instead of just using the 'talk and chalk' method as it will keep the students interest level high by making them participating actively in class. One of the methods that can be used to improve generic skills among higher education students is to incorporate cooperative learning in the teaching and learning. In cooperative learning, students work together in small groups as a team to accomplish a common goal. Findings from this study suggests cooperative learning improves selected generic skills such as communicating ideas and information, problem solving, planning and organizing activities and using mathematical ideas and techniques. Findings from this study also suggest that generic skills inculcation in the earlier part of tertiary education is more significant rather than at a later stage.

In conclusion, cooperative learning is an instructional strategy that not only helps increase students participation in class as they have to work together to complete their assignment, it is also helps to improve students' generic skills. Generic skills are skills that can be taught, and it is better to introduce these skills at an earlier stage of the education.

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