How does ‘Group Project’ facilitate students’ skills in learning?

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Abstract

Project-based learning is generally regarded as a comprehensive approach to classroom teaching and learning in which students are actively involved in investigation of authentic original problems from their daily lives. The objective of this paper is to provide a general overview of the use of group project as well as to relate this methodology with the general discourse of education.

There is a question in group project learning. Why and how do group projects help students learning? This paper provides information on implementing group project.

1. Why project-based learning?

The main purpose of using project-based learning hopefully is to educate students through a project to achieve all-around development, communication skills and particular vocational skills. It seems that project-based is used to motivate students and provide practical skills training. It is believed that group project has the following advantages identified by Nightingale [1].

(1) Students are free to make their own choice of a topic of study and thus it encourages a sense of commitment and personal responsibility for the task.

(2) Projects give students practice in learning to learn by undertaking a piece of personal research involving activities such as planning the work schedule, monitoring the work progress, searching for resources, collecting material, selecting and deciding on ways of presentation.

(3) Projects enable students to experience the satisfaction of working on a complex task over a period of time with the possibility of producing a result of permanent value and interests to the work involved.
Moreover, it also provides learning situation for students to work among others in where students are highly possible to produce a sense of self-awareness for interpersonal skills. In other words, not only the technical skills, but also other generic skills like cognitive, behavioural, language and communication skills are embedded in the learning process so that students are expected to achieve a wide range and diversity of skills in order to become professional in their vocational development.

Gibson [2] made a further attempt to break down this concept like ‘able’ or ‘increased self-confidence’ into twelve operational core skills:

1. The ability to assess one’s strengths and weaknesses. Students know what they are good and bad at, what tasks are going to be easy, difficult and beyond their capability.

2. The ability to seek information and advice. Students can locate their handy recourses, what to ask, who to ask, sussing things out, and getting the facts.

3. The ability to make decisions and agreement from working partners both within and outside the groups.

4. The ability to plan time. Students can organize and plan activities programme on a time schedule. Prioritising work flow becomes the key success at work.

5. The ability to carry through agreed responsibilities. Students are able to take up duties assigned and share with individual expertise.

6. The ability to negotiate. It means to empower students strike a bargain or discussion with others.

7. The ability to deal with people in power and authority. That is to provide opportunities with students to sort ‘people in charge’ out.

8. The ability to solve problems. That is to sort things out, find a solution and overcome obstacles.

9. The ability to resolve conflicts. It means to empower them to get over disputes.

10. The ability to cope with stress and tension. Students are under their control over their own time, place and pace of studying.

11. The ability to evaluate students’ own performance. They know how well they did, what went wrong before, during and after the project work.

12. The ability to communicate. Students are able to express their ideas clearly, and listen
to what others think.

As a whole, the introduction of project-based learning in groups provides learning opportunities for solving real problems at workplace. Students are actively engaged in a cognitively complex task which may draw analogies from daily operation and incorporate their internal mode of knowledge from across disciplines into a final product. It symbolizes the solution of the authentic problem accordingly.

Brown [3] further expounded the result of such a teaching and learning approach. Learners are even motivated to persist at problems from their workplace, meld prior knowledge and experience with new learning, and develop rich domain-specific knowledge. It is contextualized in social context that students construct their own knowledge by solving complex problems in situations in which they use cognitive skills, multiple sources of information, and other individuals as resources. In the following part, the benefits of group project learning at workplace will further be explored.

2. The benefits of group project learning

Constructivist and phenomenographic approach were reviewed by Biggs[4]. The relationship between individuals and the object of study had been discussed. According to the literature, ‘meaning’ is constructed as an internal relationship between the individual and the object of study. ‘To learn’ means to experience the object in a certain way. The meaning of a particular object is thus a relationship of experience between the individual and the object. It is therefore the importance of cognitive skill in learning cultivates students’ further development in lifelong learning. Furthermore, students are always thinking and devising new practical knowledge for themselves in every walk of life through experiential learning [5]. Project-based learning means learning through ‘experience’. However, Oakeshott [6] viewed ‘experience’ as the most difficult words in the philosophical vocabulary to manage. He focused on how experience is being used in learning situations, such as daily life, didactic classroom education, student-centred classroom education and workplace learning. Project-based learning is believed to be a comprehensive approach of learning, and not surprisingly it has become something to engage students in investigation of authentic problems. Applicable in working organization, project-based learning is conceptually underpinned by the learning-network theory, which establishes a bridge connected between authentic problems and learning [7]. Within project-based learning at vocational context, the experience encompasses three phases:

1. A diagnosis of existing conditions, developments, and problems;
2. Data feedback and formulation of learning themes; and
3. The organization of one or more learning projects.

The first step entails an investigation of existing policy developments or problems of students. These investigations can be done by survey or by observations or by interviewing any other individuals at work or at school. The diagnosis aims at finding starting points for the content of the learning project.

The next step is to assimilate data collected from within or outside organizations into a brief written report. Specific themes or strategies for learning projects are discussed and defined.

The final step consists of organizing one or more group learning projects. A learning theme represents an issue relevant to the daily work of the students about which they want to learn; and a set of activities, taking place both in formal and informal settings.

Students finally decide for themselves how the project should be set up, which learning activities will be conducted, and who should undertake them. Both the central theme and the learning objectives are defined and agreed by students so everyone in the team takes up the role in mutual support.

3. What is Project-based Learning?

“Project can be defined as consisting of a substantial piece of work on an original problem, undertaken with minimal supervision.” [8]

There is no consensus of the definition of project-based learning, there are six criteria acting as definition according to Henry [9]. Nevertheless, students usually select their own project topic, locate their own source of resource, present an end product, for instance, a report to be assessed, and conduct an independent piece of work. Project lasts over 6 months and the teacher assumes as an adviser.

Students work in groups to solve challenging problems that are original, curriculum-based, and often interdisciplinary. Students take the active role to decide how to tackle a problem and what activities to pursue. Students gather information from a variety of sources and synthesize, analyze, and derive knowledge from it. Their learning is inherently valuable because it is connected to something real and involves liaison skills such as collaboration and mediation. The most important element is reflection. Students can demonstrate their newly acquired knowledge in the final report. Students are judged by the presentation and peer assessment. The role of teachers, unlike traditional classroom teaching, is to provide feedback, guidelines and advices, rather than to direct and manage student work.
Table 1: Four stages of a project execution and associated skills

<table>
<thead>
<tr>
<th>Activities (Stage)</th>
<th>Planning (I)</th>
<th>Organisation (II)</th>
<th>Execution (III)</th>
<th>Presentation (IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills acquired</td>
<td>Self understanding, Team spirit, Innovation</td>
<td>Information search, Liaison with parties</td>
<td>Pragmatic skills e.g. drawing</td>
<td>Ability to articulate, Communication skills</td>
</tr>
</tbody>
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4. Conceptions of learning

Learning is not merely associated with the increase in knowledge and recalling bookish information. It is related to the understanding of fundamental principles and underpinning concepts, which can be applied to situations in the real world. This idea is in keeping with that of Marton & Ramsden [10], who wrote: “Learning should be seen as a qualitative change in a person’s way of seeing, experiencing, understanding and conceptualising something in the real world rather than as quantitative change in the amount of knowledge someone possesses. Learning techniques and instructional strategies are inextricably linked to subject matter and the student’s perceptions.”

It is clear that content and process are interlinked parts of learning. There is obviously no learning without content and there cannot be any learning without an act of learning (the strategy adopted to learn). Learning cannot be content free and it is more to do with a change in one’s understanding on particular subject content rather than the accumulation of facts and being able to carry out a certain procedures. Säljo [11] have identified a range of students’ concepts of learning as followings:

- Learning as increasing knowledge acquisition;
- Learning as memorizing and reproducing;
- Learning as applying;
- Learning as understanding;
- Learning as an interpretative process aimed at understanding; and
- Learning as changing as a person.

These six categories can be broadly classified into two groups. The first three tend to be concerned with a process involving the reproduction of information. In contrast, the last
three tend to view learning as seeking meaning from the material and integrating this with previous material and experiences. Students with a ‘reproduction’ learning concept tend to be pre-occupied with increasing knowledge, rote memorization and reproducing bookish information and procedures, while in contrast, students who have a ‘transformation’ concept of learning are interested in understanding the material and signs, seeing something in a different way behind the written signs and changing their perceived value of the information. Usually, students with a ‘reproduction’ learning concept tend to adopt a surface approach to learning and are labelled as surface learners; while those who have a ‘transformation’ concept tend to adopt a deep approach to learning and are labelled as deep learners [4].

Marton & Säljo [12] also suggested that deep approaches to learning result in quality learning outcomes and better grades, while surface approaches are relatively of poorer outcomes. It is clear that in order to achieve the stated outcomes of higher education, students should adopt a deep-oriented approach to learning, and thus ‘project-based’ learning comes to play.

5. Assessment for group project

At what content should the assessment be made as the project work? It usually goes through a variety of stages before it arrives at the final report. It is inappropriate to measure the effectiveness of the use of project work solely on simple behavioural measurement, such as, involvement, independence, or group work skill. Is it the final report or a variety of stages that students gone through or from peers or from the objectives set by teachers? The effectiveness of the project work not only evaluated against the prescribed teachers objectives, but also against the students own objectives. It puts in another way that both focal and subsidiary aims cannot be overlooked. Questions about subsidiary aims might be asked:

1. Have the students changed or developed during the time under work?
2. Have the students gained anything from the work delivered?
3. Have the students made any contribution to the course that he is on?

In the light of these aspects, students should establish a so-called ‘contract of expectation’ at the beginning of a project as discussed before with the purpose of the following:

(1) Students could understand their role and teachers’ role both involved in the project. Students should clarify the learning objectives identified by both teachers and themselves; and
(2) Students should make clear and negotiate the assessment criterion and its weightings. The efforts students putting into project work should contribute directly to their final total performance. It depends on both the overall objectives, and the role in which project work is viewed. If the skills and the level of competency students are expected to produce or acquire from the project work, then project assessment should play a substantial role in the final assessment.

According to Biggs’ Constructive Alignment [4], aims and objectives, teaching and learning activities, and assessment must be aligned. These three parts should all be aligned and harmonized. The model builds on what was earlier known about student learning and in the model a special instrument, backwash analysis, is also presented to ensure alignment. It is important to students because it has a major influence on their approach to learning and it finally can promote the desired learning outcomes. Assessing students is part of the learning process and should be integrated well into learning strategies. Ramsden [13] believes that “our choice of assessment methods should be conditioned by our goals for student learning” and we should think of assessment “less as a means of getting a single score for comparative purposes, and more as a means of providing opportunities for students to demonstrate how much they understand”. It also means that assessment will be more students-centred with students receiving constant feedback from teachers. Assessment methods should be used to measure ‘how well’ they have learnt and what they know rather than ‘how much’ they know the object of study. Under this perspective, the main learning activities of project-based learning in respect of knowledge, skills and attitudes of students have to be assessed.

The learning outcomes specify what students should know or be able to do by the end of the module. They have to be ‘precise’ and capable of being measured. In assessment, it is the task to measure whether students has achieved a satisfactory standard of performance in the stated learning outcomes. In order to be ‘able to do’, students must have the appropriate learning situation ‘to do it in’. Reflection by students undergoing various stages of group projects would enhance their learning skills and experiences.

An implementation of a technical subject, e.g. building design requires students to have cognitive and interpersonal skills in problem solving, identification of problems and issues, integrating of information, leadership, time management, teamwork, and a basic knowledge of computer systems. The learning outcomes for students in this module are to obtain specialized knowledge, skills, and attitude in the vocational practice as a professional to integrate theories with the application of technology in authentic world.

It suggests that it should include some sorts of discussion work on the areas of
difficulty in applications students may encounter. A methodology of allowing students to identify those strategies and to monitor their own learning process is needed. ‘Group project’ is assessed by a checklist or project guideline. It is produced to observe students’ performance in a structured group project work. The checklist, presentation and written report become parts of evidence of achievement of the learning outcome.

6. Motivation of project-based learning

How can we get our students to think about what they are doing, not just focusing on getting assignments done? How can we get them aware of the real meaning behind texts and understanding the teaching materials? These are always the issue for educators to be explored in their research. Students are provided with learning opportunities for deeper understanding of the subject matter and given the opportunities to acquire knowledge in a variety of ways. By solving the problems or knowledge and skills to make using their artefacts (for examples, a model, reports, videotape, or computer program) as group projects are relatively long-term, problem-focused, and meaningful units of instruction. It integrates concepts across disciplines. Within this framework, students like the owner of the project, pursue solutions to problem identified by asking and refining questions, debating ideas, making predictions, designing plans, collecting and analysing data, drawing conclusions, communicating their ideas and findings with their peers, asking new questions, and creating the final artefacts.

There is one essential component of project. Students should be responsible for the creation of both the questions to be studied and learning activities or strategies to be employed. However, they are not obliged to generate artefacts, because it is through the process of generation. Students construct their knowledge so that doing and learning are inextricable. The final artefact is a representation of the problem solution which could be shared and critiqued among peers and other resources. This could allow an interactive way between students and others to generate feedback to work on reflection on their own even in the absence of driving questions.

A number of factors should be considered for motivating students to engage in group project learning. Factors such as whether students would find the project interesting and valuable to them, their perception of their competency to engage in and complete the project, and focus on learning skills development rather than on outcomes and grades. Although there are always individual differences influencing, interesting and valuable elements are still important to students [14]. Projects can be designed to increase the likelihood that most students will be motivated. Consequently, prior to any educational design on the curriculum level, like project-based learning, both the aspects of the presage, students’ characteristics and learning context of the 3P model are of great value [4].
The 3P Model focuses on how different presages can influence students’ approaches to learning. This in turn affects the learning outcomes. The presages are of fundamental importance for student motivational learning. Questions like the followings have to be addressed. How diversified are the students’ backgrounds at each academic levels? What kind of relevant experiences they have to build on in the new learning process? What are the expectations from students and the perceived value of students? How does this kind of expectation affect the curriculum in design? A successful implementation of learning strategies requires this process of questioning if it is neglected, even motivational learning strategies may either become a short lived fad or result in no profound educational effects on student learning.

7. Guidelines designed for implementation

Project guidelines should be distributed to students as a framework of what research activities are to be pursued. Questions about features likely to affect competence should take into consideration, for example, “How should students’ prior knowledge be considered when designing projects implementation and activities for representing key ideas so that students will be able to understand course materials and develop competence?” Students have to gather information from a variety of sources and synthesize, analyze, and derive knowledge from it. Their learning experience is benefited from real things. It focuses on skills such as collaboration and reflection. It is developed and manifested throughout the group project. The heart of good instruction constitutes intellectual challenge, rigorous real-world standards, and student engagement in relevant and meaningful work. A well planned project should be built on student interests and passions. It should also provide a meaningful and authentic context for learning. Students should be immersed in complex, real world problem without a predetermined solution. This is particularly crucial for promoting deep learning simply because it is through the process of generation. Students construct their own knowledge, skills and attitudes through doing and learning. All students should take the lead and provide leadership. Students’ work should be connected to multi-level and disciplinary fields. There should also have chances for reflection and self assessment. To gain those benefits from the implementation of group project, the following simplified steps are suggested

1. Formation of groups according to individual’s strength: a combination of different expertise, respect each others, and willing to work as partners.

2. Agreement of project aims, roles of members in the group: each member is accountable for some duties, all members are entitled to ‘equal’ participation, duties are clear and understandable, and actions are justifiable.
3. Plan and schedule: there should be a definite, realistic time schedule and critical dates. All members should feel comfortable with the arrangement e.g. time, challenge and nature of work.

4. A proper record of information search, i.e. search log.

5. Regular meeting to review progress: an agreed frequency of meeting with rotating chairperson, and meeting are recorded in the way of minute.

6. Decisions are such that everyone has a say in them and they are not divisive. If it is not, members responsible for those particular duties could chair the discussion. A simple majority voting could help.

7. Communication is such that it is open, respectful, everyone participating and listening as well as speaking.

8. Regular report to the teachers: upon completing a group project, students reflect individually on the project, successes, trials, or failures and determine what went wrong and what went right. Students are also expected to suggest solutions for success or pitfalls to avoid in future.

9. Reflection note on self and peers assessment

   With the intention of promoting self-awareness of existing conceptions and undergoing various stages of a group project, students are suggested to do a reflective note on their group project experience. They will find out a lot about their skills and themselves in general by answering a serious of prompt questions such as: Have I been a good team player? Why would I think so? What have I learnt about working with others? What do I or the team need to improve? What difficulties have I encountered in applying my knowledge and skills in dealing with the demand of the project? What would be the causes for those difficulties and how could I overcome them? Could it have been otherwise?

   The functions of these prompt questions and reflective notes are to stimulate students’ reflective thinking and develop their skills to adapt and improve their experience. Students can be able to understand and evaluate an experience and ultimately regulate their behaviour accordingly.

   Obviously, features of project design are not the only factors that facilitate students in group project learning; teachers play a considerable role. Students are interested in and believe them capable of doing projects.
8. **Role of teacher in enhancing group project-based learning**

With the intention of helping students prepare for the competence development, teachers play a crucial role in creating learning environments that promote motivation to learn and encourage inquiry. Risk taking and cognitive thinking are related to information.

Traditionally, teachers often view learning as a process of transmission of bookish information to students rather than an active process of knowledge construction. In project-based teaching, teachers need to

a) Create opportunities for learning by providing access to relevant information;

b) Support learning by designing instructions or meaningful learning tasks where they are challenged to describe, reflect, discuss analysis and evaluate their new or integrated understanding and skills in their respective workplace experience.

c) Encourage students to accept risk-taking of errors is natural to learning as errors can be positive to kick off students’ deep learning; and

d) Assess progress, diagnose problems, provide feedback, and evaluate overall results.

In addition, teachers should not prescribe predicted solutions for students during the process of learning even guidelines of instruction are provided. As quoted from Barnett [15]: “Higher education is faced not just with preparing students for a complex world but a super-complex world. It is a world where nothing can be taken for granted, where no frame of understanding or of action can be entertained with any security. It is a world in which we are conceptually challenged, and continually so” and “Individuals…having to take…responsibility for continually having to reconstitute themselves during their lifespan.”

It means that learning should not only be bounded by any framework of ideas or of action. Out of the four walls of classroom and the class contact hours, students should act to learn across time and space. Learning can be enhanced not only through face-to-face sessions with teachers or peers, but also through interacting with other people in different kinds of out-of-class contexts by technology-based activities such as discussions and forums in web, workplace or even community-based experiences in partnership with different professionals across disciplines so as to widen their scope of horizon in learning. This kind of teaching and learning belief is compatible with a constructivist approach. It must be firmly held by teachers when group project-based teaching strategy is adopted.
9. Conclusion

Project-based learning is nothing new, but has long been recognised and valued as an effective learning approach. The benefits to be gained from the work progress are almost seamless. Students’ skills in learning can be trained throughout project-based learning including generic and transferable skills that are needed for future development in their professionalism and in their life-long education.

People reject project-based learning because they have probably not discovered the range of advantages. These include: communication of idea; discussion of alternative strategies; critical debate; insight into the process for making judgement; and the generation of enthusiasm. Furthermore the daily participation in group work, students can achieve a pattern of constant interchange of ideas in a way that would probably not be possible in individual work. Skills, abilities and personal development are difficult to be developed by more formal and traditional teaching methods. The main focus of group project lies on learning. Learning in the group project set a great value on learning skills identifying, analysing and correctly defining the real life problem. The main focus is on ‘how’ rather than ‘what’; skills for independent work; skills for effective communication and the last sense of ‘inadequacy’ from students were identified. Houle [16] set out fundamental principles of self-directed learning, and citing research carried out by Johnstone & Rivera [17]. Knowles [18] did a study on adult learning. ‘Students should educationally have a control over their own learning, and teachers have usually taken an enabling or facilitating role towards learners, rather than the ones based on pedagogic principles of instruction’.

In group project, students may have partial or total control over various aspects of their learning, such as topic of selection, material to be chosen, learning method, assessment criterion and so on. Such control can be negotiated between students and their teachers. In general, students’ performance has to be criterion referenced. Their application in a project work should be negotiated initially between the teachers and themselves as set in their learning contract.

This brings finally to the nature of the use of project method, which is in contrast to examinations. In a nutshell, one of the most appropriate teaching and learning methods for students’ all-round development is group project-based learning.
Bibliography


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