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CREATIVITY & PROJECT WORK: A SYMBIOTIC RELATIONSHIP?

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Abstract: Project work may be an excellent tool for teaching students to be creative. It requires the teacher to establish a classroom atmosphere where students are encouraged to collaborate and take risks. Practical steps are outlined in this paper to assist teachers introduce project work to students in a way that emphasises the close relationship between creativity and project work.

Introduction

Currently in Singapore there is much discussion about the role of project work in promoting critical and creative thinking. In 2003, it is planned to assess student project work as one of the criteria for university selection. This development has implications for the introduction of project work at all levels of the education system, in primary and secondary schools, as well as in JCs. Project work is an excellent tool to teach students to be more creative. Because the project work topics will be interdisciplinary, requiring students to draw on knowledge from at least two subjects, students will be encouraged to step outside traditional disciplinary boundaries, to think “outside the window”, and to produce original project work outcomes. In this paper, several strategies will be outlined to assist teachers to enhance students’ creativity in carrying out the phases of project work, as well as to assist teachers in its assessment.

The American philosopher, John Dewey (1899), developed the project method as a teaching-learning strategy in his laboratory school at the University of Chicago. He conceived of project work as a tool designed to teach students how to carry out a piece of research from idea to final product. Today, one hundred years after Dewey devised his project method, students’ critical and creative thinking skills may be developed by using nine learning strategies in carrying out project work.

Brainstorming the Topic to Decide How to Approach it

Brainstorming is an effective technique for generating ideas. The technique is based on the assumption that all ideas are valuable and no idea is to be rejected before it is considered carefully by the group. Here are some useful strategies for teachers to assist the brainstorming process:

- (i) Ask each group to elect an informal leader who encourages all members to come up with ideas on how to clarify and define the project topic's focus;
- (ii) Ask each group to elect a recorder to write down all ideas as they are suggested;
- (iii) Suggest that the recorder use a whiteboard to write up all the ideas as they are generated;
- (iv) Another approach is to attach a large sheet of white paper to the wall and write ideas on it. The leader must state that all ideas are welcome and encourage all group members to contribute. He should ask all members of the group to think of ideas and share them with other members. Sometimes a group member is shy, but an effective leader is sensitive to his wish to contribute and gently urges that member to share the idea with the group. These ideas are often very creative and confirm the saying that "still waters run deep";
- (v) Suggest to all groups that, after all the ideas on how to clarify and define the project topic are exhausted, the group leader asks the members of the group to link the ideas in a way that makes sense to the group;
- (vi) Use the Internet to draw up a concept map. The AXON Idea Processor, which is currently available in Singapore, is an excellent template for generating concept maps; and
- (vii) Ask students to consider carefully all the ideas and their connections in order to define the topic clearly and how the group intends to attack it.

Deciding What Resources are Available on the Topic

The teacher's role is that of a tutor who facilitates student progress through the various stages of project work. You should encourage your students to take risks and perceive mistakes as being an essential part of the learning process. You may not know everything there is to know about the project topic, but you will be able to suggest where students might begin looking for the relevant information. You can help clarify their problems, rather than give answers to student questions. Urge your students to take responsibility for asking more of their own questions and searching for the answers to those questions. Here are some useful tips to help you carry out your role as a tutor:

- (i) Encourage your students to take risks and to perceive mistakes as being part of the learning process;
- (ii) Respond to students' questions by suggesting where they may locate the answers. You are a model who cannot possibly know everything there is to know on a given topic, but you can suggest to students where they might begin looking for relevant information;
- (iii) Clarify their problems, rather than necessarily provide answers to all students' questions;
- (iv) Urge your students to take responsibility for asking their own questions and searching for the answers;
- (v) Assist your students' use of metacognitive skills, such as planning, monitoring their progress, and evaluating their performance;
- (vi) Challenge your students to conduct Internet searches by typing in key combinations of concepts in order to locate relevant information;

- (vii) Use library computer catalogues to search for references by author, subject and title;
- (viii) Encourage your students to talk to experts in the field by email, by telephone or in person, in order to find out the latest research findings on the topic. Most experts are happy to give advice to keen young students; and
- (ix) Suggest they consult newspapers for any relevant articles.

Devising a Time Management Plan

A time management plan is essential to ensure that all the project tasks are completed on time. This plan will carefully lay out all the steps that are necessary to be done by certain dates, so that the final products of the written report and oral presentation are finished on schedule. You need to emphasise that a consistent level of effort is necessary to avoid last minute crises. The following strategies will assist the writing of a time management plan:

- (i) Break the project tasks into small steps;
- (ii) Work backwards from the project report and presentation due date by assigning dates for the completion of all the stages of the project work;
- (iii) Draw up a time plan for the period until the due date. The days of the week may form the horizontal axis, while the hours of each day from wake-up time until bedtime will become the vertical axis. This can be repeated for the number of weeks assigned to the project;
- (iv) Check whether the time plan covers all the stages leading to the goals;
- (v) Highlight three priorities for each week that the group works on the project;
- (vi) Evaluate the group's progress towards the goal after one week and modify the time plan if necessary; and
- (vii) Continue to monitor the time plan until the project is completed.

Allocating the Various Tasks to the Individual Members of the Group

This process relies on the group leader's skills in learning about the skills of the individual team members, receiving suggestions from each member, and diplomatically assigning responsibilities to each project team member. The teacher's role is to advise all the groups to use individual students' skills in order to achieve the most polished products in the available time. Here are some strategies to optimise this allocation process:

- (i) List all the tasks that need to be completed;
- (ii) Assign group members to gather information, knowledge and evidence on various aspects of the chosen topic;
- (iii) Analyse the information and check for inconsistencies;
- (iv) Synthesise the information into a clearly structured framework for the final report;
- (v) Assign members to write the various sections of the report;
- (vi) Allocate a member who is responsible for using graphics creatively to illustrate the report; and
- (vii) Prepare for the oral presentation.

Gathering Information about Various Aspects of the Topic

There is a wealth of information available on the Internet. The trick is to be able to surf the Net intelligently in order to choose the information that is credible and relevant to the project topic. You can assist your students to choose the most appropriate material by suggesting the following steps:

- (i) List the various aspects of the topic that require researching;
- (ii) Enter various combinations of specific concepts into several servers in order to download relevant information;
- (iii) Check the accuracy of this information against recent reference books in the field. Sometimes even recent textbooks are out of date, so it is essential to verify information downloaded from the Internet with other sources, such as journal articles; and
- (iv) Remember the saying “A picture is worth a thousand words”. Creative use of graphics and multimedia presentations can make the final products so much more persuasive.

Organising and Analysing the Research Findings

Remember that the research findings included in the project report must be relevant to the focus questions that were devised by the group members. You can assist them at this crucial point of the project by using the following strategies:

- (i) Require each group start and update a Group Project File;
- (ii) Organise the file into the important aspects of the topic, as defined by the group;
- (iii) Keep accurate records of Internet website addresses and book reference details in case they wish to re-examine the source;
- (iv) Analyse the information collected for inconsistencies;
- (v) Compare and contrast the information so that they can see the important trends in the research findings;
- (vi) Reflect on their learning, rather than thinking impulsively and coming to invalid conclusions; and
- (vii) Start writing down ideas linking the various readings and aspects of the topic.

Generating Ideas about How to Write up the Project Report

This stage of project work requires another brainstorming session, where the various ways of synthesising all the information gathered in the research phase are explored by the group members. It is a collaborative process, which is crucial to the quality of the final product. The teacher can facilitate this process by:

- (i) Encouraging the students to be reflective, rather than impulsive in their thinking;
- (ii) Reminding the group leader to review their progress to date and to ask for suggestions as to how to proceed in writing the final report;
- (iii) Creating an open, informal atmosphere where all suggestions are treated seriously by the group;
- (iv) Debating the various alternative suggestions before the group decides how to structure the report;
- (v) Choosing which information and arguments are relevant for each section of the report; and

- (vi) Allocating each group member to be responsible for writing a particular section of the final report.

Integrating the Information into a Coherent Written Report and Oral Presentation

Once the individual group members have written their sections of the final report, the next task is to integrate the information gathered into a coherent whole. This process is strengthened if the group is clear about the content and structure of the report. A common writing style should be agreed upon by the group members before the formal writing of individual sections begins. You can serve as a tutor at this stage by adopting the following rules:

- (i) Be available if the group comes to you with problems of how to structure the final report;
- (ii) Reflect their questions by re-phrasing them or making constructive suggestions, rather than telling them how to do it;
- (iii) Remember that the final product is the joint responsibility of the group, so the group members have to make the decisions as to how the report is to be written and the various sections coordinated;
- (iv) Encourage the group to persist in the face of temporary uncertainties and problems. At this stage the group may lack confidence that they can complete the task. A reassuring word will do wonders for their commitment to finishing the task; and
- (v) Praise progress reports, good points and ideas, so as to motivate the students to give of their best;
- (vi) Advise each group that their oral presentation is not meant to be a summary of the whole project. It should highlight the major issues addressed by the group and should be presented in a way that is stimulating for the audience. Each group member is expected to take part in the oral presentation and to answer questions posed by the two tutors. Creative oral presentation formats may include a debate, a role-play, a video-assisted speech, and a PowerPoint presentation. Preparing for the oral presentation gives each group member the opportunity to reflect on what they have learned from the whole process of doing the project and synthesising in a few minutes the main ideas to come out of their research.

Evaluating the Quality of the Final Draft before Submitting the Report

The final stage of project work requires the important metacognitive skill of evaluation. This is one of the highest of Benjamin Bloom's cognitive domain objectives. It requires an ability to step back from the intense activity of completing the report and judging whether the report answers all the questions the group started out with, and whether it answers them persuasively and in an attractive format. You can assist the students' evaluations by adopting the following strategies:

- (i) Encouraging them to be constructively critical of their work, and not to accept a “near enough is good enough” standard for their product;
- (ii) Asking them if they are satisfied that their report or outcome is not only accurate, but creatively presented;
- (iii) Questioning whether they have met all the criteria on which the report will be assessed. All groups should be informed at the outset about the four PW domains of knowledge application, communication, collaboration and independent learning, which were outlined in Table 1 and which will be assessed;
- (iv) Supporting the group leader who is responsible for coordinating the evaluation process;
- (v) Ensuring that they understand the meaning and implications of plagiarism; and
- (vi) Giving the group the opportunity to go over the report one last time to correct any errors and change its structure if they think it will improve the report.

How to Assess Project Work

Assessment of project work is a critical part of the learning process (Mau, 1997). The *process* of doing project work, as well as its *product*, will be assessed. The processes of collaborating, planning, acquiring information, synthesising knowledge, and presenting it in both an oral presentation and a written form are to be assessed for all individuals and the group as a whole, according to guidelines produced by MOE. Teachers may draw up a progress assessment form, including each student’s name, date, his/her assigned tasks, what has been completed and a teacher verification/signature column. Teacher comments need to be carefully written, focussing on using appropriate strategies to improve the student’s project work, so as to be constructive, without directing the student’s activities too prescriptively.

The teacher combines both *formative* and *summative assessment* techniques to determine the extent to which students have met the learning objectives. *Formative assessment* is designed to assist the group’s progress towards the final report, checking that each group member is contributing to the achievement of the common objectives by playing his part in the group. *Summative assessment* occurs at the end of the project when the final product is assessed on a number of criteria, such as effectiveness of communication, appropriate use of information technology (IT), evidence of creative and critical thinking, accuracy of content, and collaboration skills, as indicated on the progress assessment form. It is important that both *the process* and *the product* of project work are assessed, so that students’ critical and creative thinking skills are recognised and rewarded.

The aim of assessing project work is to find out what the students are able *to do*, rather than what they are able *to memorise*. Here are some strategies for assisting you in the assessment of project work:

- (i) Monitor each group's progress regularly. Some groups will welcome your presence as an opportunity to ask clarifying questions, while other groups will work seemingly oblivious to your presence, because they are so engrossed in learning and investigating their topic;
- (ii) Occasional conferencing with each group serves to review progress and point the group's investigation in the right direction. It can help avoid digressions which result in the loss of valuable time;
- (iii) Reading through each group's Group Project File is a good way to see if the group is going about their research effectively by comprehensively searching for evidence on the topic. It can also reveal if they have overlooked an important source of information, such as a site inspection, an interview with an important person, or a particularly relevant website.
- (iv) Assess students' ability to integrate information from various subjects in writing their report. The report needs to show evidence, not only of analytical skills in the two or more fields covered by the topic, but also of the synthesis of all the information into a coherent and persuasive product;
- (v) Look for evidence of creativity in both the report and the oral presentation. Ability of the students to think "out of the box" by adopting an ingenious approach to the topic is to be recognised and rewarded. Of course, the approach should be relevant to the topic and provide new insights that are unconventional and convincing. Sometimes creativity is difficult to spot, simply because it is unusual. Nevertheless, a report or oral presentation which stands out from the others because of its fresh approach to the topic is something that you should be looking out for;
- (vi) Examine the oral presentation by assessing the effectiveness of the group's communication skills. Informing each group of the importance of presenting their ideas fluently, coherently, confidently and persuasively will guide their preparation for the experience;
- (vii) Advise all groups that a multimedia presentation will be more effective in helping other students remember their presentation, because it appeals to several senses, such as the visual, auditory and even the kinaesthetic sense of touch if there is a concrete teaching aid. The important point, though, is to use IT or a teaching aid to *assist* the presentation, not *distract* the audience's attention by its "whiz bang" quality. For instance, too many PowerPoint slide presentations break the cardinal rule of not showing all bullet points at once. Rather, bullet points should be introduced one at a time, so that the audience's attention is concentrated on a single fact, concept or principle at a time. It helps to hand out the slide presentation in advance, so that the audience can take notes to elaborate on the slides, rather than be distracted by having to write down the main points of the presentation;
- (viii) Assisting individual students to work collaboratively is an important part of your role as a tutor. Some students, especially the brighter ones, may prefer to work individually and need guidance on how to cooperate to achieve group goals. You can help them to understand that their performance in PW will be assessed partly on their ability to work cooperatively to achieve the group's objectives and to

- finish the final report on time. Some students become impatient when progress is not made as quickly as they would expect. You can persuade them that the group report will be more coherent and professionally produced if everyone is committed to the project;
- (ix) Monitor each group's use of time, so that progress toward the final product is maintained consistently and that the set targets are achieved on time; and
 - (x) Assess independent learning by giving guidance to each student in completing both his Project Journal once every two weeks during the project and the Reflection Log at the end of the project. These tasks are intended to promote reflection and self-directed inquiry, which are important thinking skills. They are also qualitative evidence for the teacher to provide feedback to students about their independent learning. Both cooperative and independent learning are outcomes that are anticipated to occur as students undertake project work.

By creating a “safe” classroom atmosphere where risk-taking and curiosity are encouraged, you will enthuse their students by your example. Your role is to foster students' attempts to ask questions. You should avoid giving them answers. Rather, you should point the students in the right direction, then step back and allow students to find their own answers. There will be many possible answers to the questions that students pose. By discovering the answers for themselves, students will engage in what Bruner (1966) called “genuine learning”, rather than rote learning. In this way, they will remember what they learn far longer than if they had been told the answer. Students will increasingly search for answers using the Internet. Other learning resources include databases on CD-roms, visiting sites, interviewing experts, and accessing library catalogues on-line. Teachers may organise excursions to give students a first-hand learning experience, go to a museum, or have a “virtual reality” experience. Vital thinking skills are learned through cooperative project work, with the aid of supportive teachers.

Conclusion

Project work is an excellent tool to enhance students' creativity. By emphasising the interdisciplinary nature of the project work topics, teachers will encourage their students to take a fresh look at what they have learned in traditional school subjects. Such an inquiry approach, which begins with student curiosity and produces creative solutions which are different for each group, emphasises the “symbiotic” relationship between creativity and project work – a relationship which is close and mutually beneficial. On the other hand, if project work is introduced to students as just another hurdle to jump over in order to achieve their goal of gaining the best possible grade, then a valuable opportunity will be lost to make project work a creative experience. A positive teacher attitude to introducing the project work with curiosity and enthusiasm will model for students the very attitudes that they will adopt as they complete their tasks. In this way, they will regard project work as one of the highlights of their school learning experience.

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