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PROBLEM BASED LEARNING: A CASE STUDY

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*Abstract

Problem-based learning is a teaching method that pushes students to work independently or in a group to create ideas and plans to solve a societal need. As early as 1960 Barrows and Tamblyn introduced problem based learning process at the medical School programme at Mc Master Medical University in Canada. Presently the process is applied in school college levels in the areas of social science, education, law, mathematics, business, economics, engineering, architecture, MBA programs and other health sciences.

Based on principles like applicable for any one ,self identified goals , self directed study , learning in groups with a tutor , all members of the group have a role to play, knowledge acquisition through combine work, enhancing teamwork and communication for future practice etc. Problem based learning has strategy that student or group of students should try to solve a problem or a set of problems which are unfamiliar to them to produce a product. It is claimed that problem based learning is very effective and case study has great impact in problem based learning.

There are many advantages in problem based learning. Simultaneously the process has disadvantages too. Therefore, there are many challenges in this teaching method.

To overcome these challenges and for successful implementation of the process teachers should be deeply educated in methodology of problem based learning. For this faculty development program is needed. Government and non government organisations, policy makers and educational managers should put effort into faculty development programme.

***Keywords:** Problem based learning, Students interest, Teacher's Knowledge, Need of faculty development programme.*

M.Ed. Student, Ganga Institute of Education, Kablana

PROBLEM-BASED LEARNING

Definition

There are many definitions of problem based learning.

a) **According to Wikipedia,** Problem Based Learning is a student centred pedagogy in which students learn about a subject through the experience of solving an open ended Problem found in trigger material.

b) Duchetal. stated, Problem Based Learning is a teaching method in which complex real world problems are used as the vehicle to promote student Learning of concepts and principles as opposed to direct presentation of facts and concepts. It can promote the Problem solving abilities, development of critical thinking skills, communication skills and provide opportunities for working in groups, finding and evaluating research materials and life long learning.

c) Wood defined, Problem Based Learning is a process that uses identified issues within a scenario to increase knowledge and understanding.

In general, Problem Based Learning is a teaching style that pushes students to become the drivers of their learning education to work independently or in a group to create ideas and plans to solve a societal need.

History

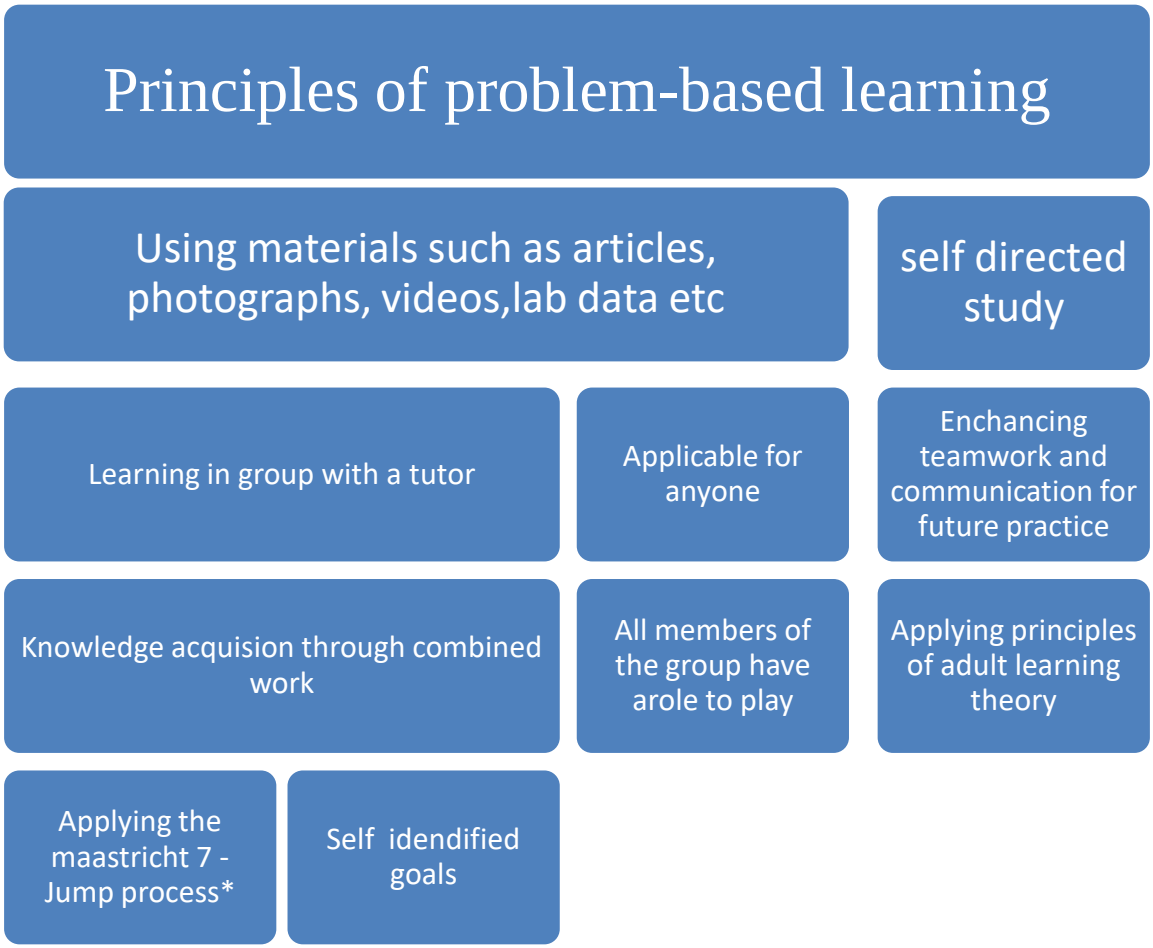
In 1960s Barrows and Tamblyn introduced Problem Based Learning process at the medical school program at McMaster University in Hamilton.They observed that "traditional " lecture approach did little to provide learners with content or applications of curriculum especially in teaching disciplines like anatomy, neurology, pharmacology, psychology etc.[3].Problem Based Learning process was subsequently adopted by other medical school

program to maintain a higher level of motivation towards learning. In 1985 the Illinois Mathematics and Science Academy provided high school students with a complete Problem Based Learning curriculum in the academy also served thousands of students and teachers as a centre for research on Problem Based Learning[4].The University of Delaware started an active Problem Based Learning programs for instructors wanting to become tutors. Samford University in Birmingham, Alabama incorporated Problem Based Learning into various undergraduate programs of Education, Nursing, Arts and Sciences, Business and Pharmacy. Universities developed curricular materials in Problem Based Learning for all core disciplines in high school [5].Aalborg University in Denmark started programs in engineering, natural and Social sciences based on Problem Based Learning [6].The UNESCO chair in Problem Based Learning in engineering education is currently going on at Aalborg University [7].Roughly 20,000 students are following Problem Based Learning principles.

In this way Problem Based Learning process through initially started in medical schools, was ultimately expanded to include education in the areas of social studies, education, business,law,economics, Mathematics engineering, architecture, MBA programs and other health sciences[9-11].

Principles

Principles of Problem Based Learning process are as follow:



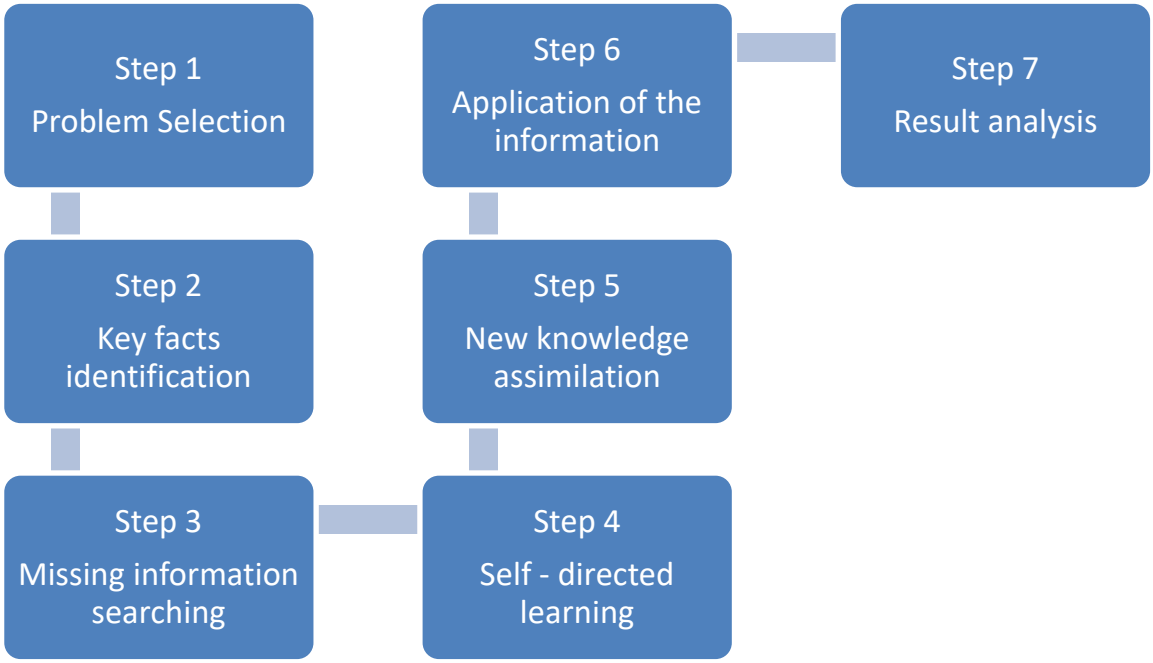
1) To discuss the case in a group 2)To identify the questions 3) To identify the knowledge and potential solutions of the members 4) To analyze and structure the results 5)To formulate learning objectives 6)To do independent/group study 7) To discuss the findings [source - Wikipedia 12]

Strategy

Based on certain principles strategy of Problem Based Learning is ,student or group of students try to solve a problem or a set of problems which are unfamiliar to them to produce a product. This can be done in classroom, tutorial or seminar setting Teacher sets the topic of the problem and then allows the student to explore on the topic to create the product.

Steps

Steps of Problem Based Learning process may be represented as follow :



Characteristics

According to John R. Survey [13] Characteristics of Problem Based Learning are :

a) Students should be responsible for their own learning.

b) The problem simulation must be ill - structured and allow for free inquiry.

c) Learning should be integrated from a wide range of disciplines or subjects.

d) Collaboration is essential.

e) Students learning must be applied back to the problem with reanalysis and resolution.

f) Closing analysis and discussion are essential.

g) Self and peer assessment must be carried out at the completion of each problem.

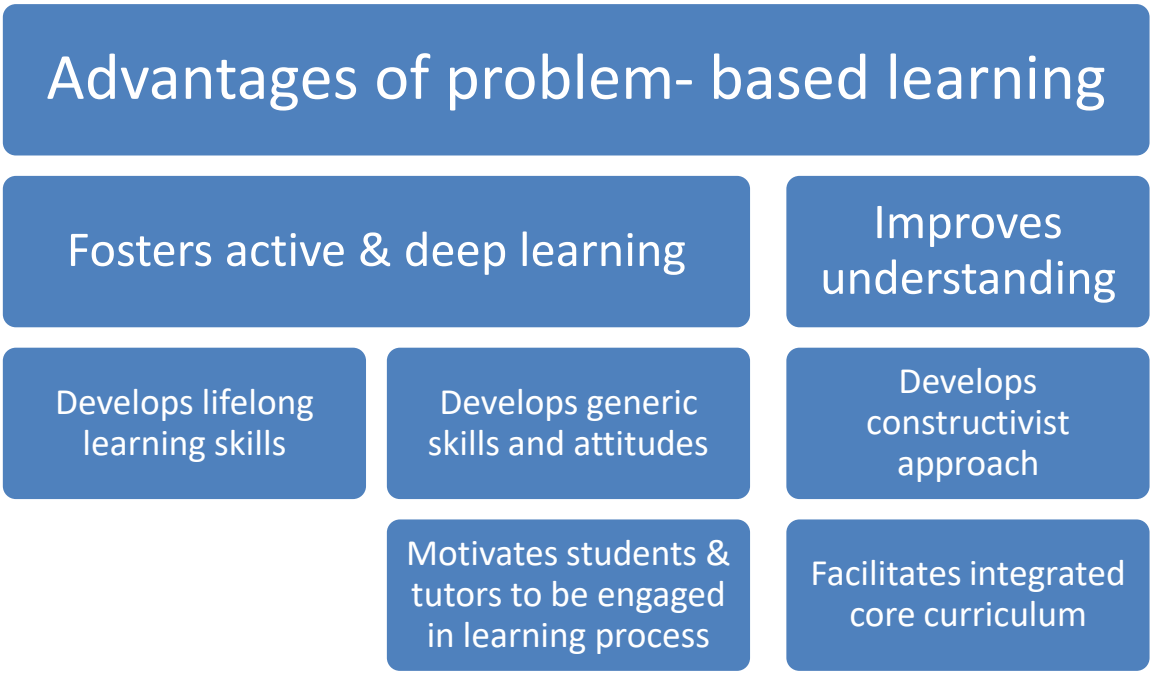
h) Activities undertaken must have values in the real world.

i) Student examinations should be there to assess student progress.

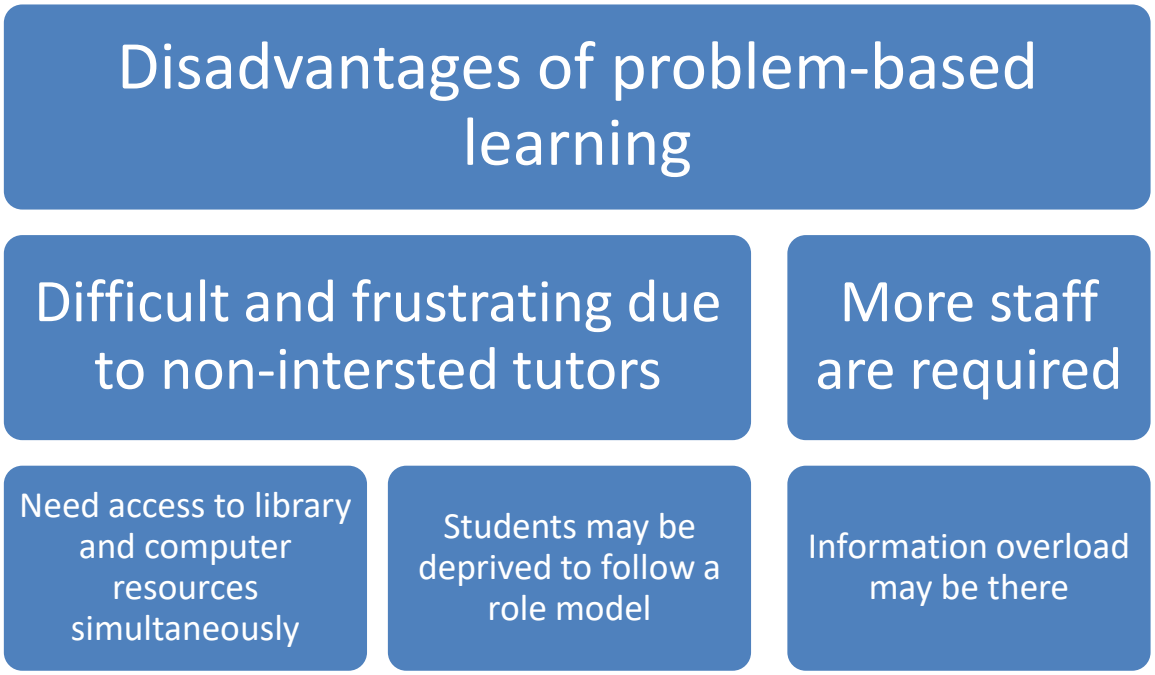
j) It must be the pedagogical base in the curriculum.

Advantages and Disadvantages

Advantages of Problem Based Learning are represented as below.



Disadvantages of Problem Based Learning may be represented as follow.



Effectiveness

Effectiveness of problem based learning depends on,

1. Content Learning
2. Process Skill and
3. Student engagement

Therefore, to create Effective problem based learning scenarios; stress has been given on following points [14].

a) Problem Based Learning should have sufficient interest for the students.
b) Problem should be appropriate to curriculum.
c) Problem should be appropriate to the level of students understanding.
d) Problem should be sufficiently open for a long discussion.
e) Problem should have relevance to future practice of the student.
f) Learning objectives should be defined by the students.

g) Student should be involved in seeking information from various learning resources.
h) Scenarios should promote participation by the students
i) Scenarios should encourage students to seek explanations for the issues presented.
j) For medical study basic science should be blended with clinical scenario for integration of knowledge

Role of Case Study in Problem-based learning

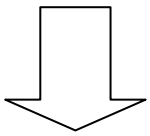
A case study is an in depth study where Problem within a real life or work related context is tried to solve .It includes interaction among different members of a group ,development of personal skills and use of reflection as part of learning. In general science, political science, social science, anthropology, education, medicine, psychology case study can be used.
According to Kevin M.Bomey [15] case study is important because,

a) It brings a complex topic to a group of students.
b) It helps generating new ideas.
c) It reduces biasness.
d) It gives opportunity to the Students to apply their skills.
e) It creates interest among the students.
f) It gives opportunity to gain greater understanding of the subject.
g) It is useful where solutions are uncertain.

Case study may be different types.

A typical case study maintains following steps.

Case is introduced



First meeting among the students

For

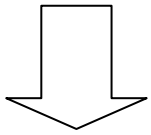
Clarification of unfamiliar terms

Framing the case

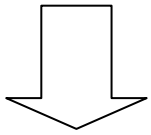
Brainstorming

Categorization of ideas

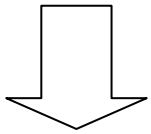
Formulation of learning objectives



Self study & Research



Presentation



Few examples of case study :-

1. A student prepared 10% aqueous solutions of sodium chloride and sodium sulphate. After mixing 15 ml of both these solutions in a conical flask the student weighed the flask on a balance. Flask was stirred with a rod after sometimes it was gain weighed. Student showed that there was no change in mass. Was the student able to verify the law of conservation of mass?

To solve the problem student must know Law of Conservation of Mass which states that the mass can neither be created nor nor destroyed but is transformed from one form to another. In this case the student could not verify the law of conservation of mass in - spite of the fact that there was no change in mass.The student committed mistake by taking sodium chloride and sodium sulphate because no reaction actually took place in the flask.To verify the law of

conservation of mass the student should have performed the experiment by taking aqueous solution of barium chloride and sodium sulphate when a chemical reaction takes place after their mixing and a white precipitate of barium sulphate is formed.

2.In the class a teacher takes some water in a beaker. He then tells one student to put a block of ice inside water. After doing that all students observe that the ice block are floating on water. Teacher tells, you all know that density of solid is more than that of liquid .Then why the ice block is floating?

Students start searching books and come to know that ice has cage -like structure where vacant spaces are present between water molecules when they linked in ice. So ice is more porous than water thereby lighter than water and therefore floats over the surface of water.

Challenges

There are many challenges in Problem-based learning. Few are:

a) Students do not take proper interest.
b) Teachers are inactive; do not take interest in teaching.
c) Students may not get proper research resources.
d) Students may not be able to design clear solutions to every problem they encounter.
e) Students may not know what to do. In problem based learning teacher give freedom to the Students regarding choice but the students may not know what to do with this freedom.
f) Teachers do not have sufficient training and enough experience.
g) Teachers may feel uncomfortable with non routine curriculum.
h) Problem based learning requires more time and takes away study time from other subjects.

i) Problem based learning may create anxiety because situation may be confused and difficult to deal with.

j) Less content knowledge may be learned.

Conclusion

Problem based learning is becoming increasingly popular. It is now a major component in the Undergraduate curriculum. But for its successful implementation Teachers should be deeply educated in problem based learning methodology. For this faculty development program is urgently needed. Government and non government organization, policy makers and educational managers should put efforts into faculty development program

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