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Enhancing Problem-Based Learning Through Barrells Kwhlaq Strategy

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Abstract: Education system is getting revised in a progressive manner and it is at this point of time the new educational approach of integrating KWHLAQ strategy to Problem Based Learning has its importance. Problem Based Learning can be regarded as a powerful concept for active learning in education, but is left with no structure to implement if a proper strategy is not aligned with PBL. This paper aims to explore the effectiveness of KWHLAQ strategy if integrated with Problem-Based Learning (PBL) as an innovative approach to meet the PBL principles in a well-structured, organized and guided manner. The KWHLAQ strategy provides a framework that aligns with the core principles of PBL, in in which the learners actively involve in finding solution for ill structured problems related to real-world contexts provided in PBL scenario. The explanation on synergies between PBL and the KWHLAQ strategy, demonstrating how the latter can enhance problem-solving give a deeper insight of why this approach is significant.

Index Terms - KWHLAQ, problem-based learning, integration of KWHLAQ with PBL

I. INTRODUCTION

It is a basic principle that human evolves to find better way of life by constantly facing challenges and finding a way to solve it. Keeping this in consideration, current education system can be considered to be in a phase of transition from traditional learning methods to innovative methods which motivates the learners to actively learn and be capable of solving real world problems. Instruction should be geared not just toward imparting a knowledge base, but toward developing reflective, analytical, creative, and practical thinking with a knowledge base. Students learn better when they think to learn ...They also learn better when teaching takes into account their diverse styles of learning and thinking (Sternberg, 1998). National Curriculum Framework (2005) stresses on the learning by doing, that is through activities, discovery and exploration, that too in a learner centered manner. National Curriculum Framework for Teacher Education (2009) emphasize that a teacher should act as a facilitator of learners learning process, assisting them in the process of construction of knowledge. In this process, the teacher is seen to a co-constructor of knowledge. National Education Policy (2020) India highlights the concept of student-oriented pedagogies as it provides a crucial space for psychological development and learning of students. Out of many such innovative learning techniques like Inquiry Based learning, Project Based Learning, Interdisciplinary Approach of Learning etc. Problem-Based Learning (PBL) stands out unique for its pedagogical approach in which students will explore and solve open-ended problems which are related to real life situations. Its important to note that this method improves critical thinking, creativity, and self-directed learning—skills essential for the 21st century. Hence, we can say that, compared to traditional instructional methods, Problem Based Learning however takes a more holistic approach.

II. WHAT IS PROBLEM BASED LEARNING?

PBL is the learning that results from the process of working towards the understanding or resolution of a problem. PBL is an instructional method in which students learn through solving problems and reflecting on their experiences (Barrows & Tamblyn, 1980). If in case, we consider a classroom and seek for answer for the question "What percentage of the students within each class are self-directed, engaged, and active in learning process", it will be clear that, each year fewer become active and motivated learners. It is here PBL method has its significance. PBL, when considered as aa teaching strategy, is obviously a learner centered approach that empowers and creates an environment for learners to conduct research, integrate theory, and apply knowledge constructed in practice to develop a viable solution to a defined problem… Problem-Based Learning is an instructional approach that can be used to construct and development of the curriculum (Savery, 1995). In other words, we can say PBL to be an instructional method which prepares the students to "learn to learn" (Dutch et al., 2001). In PBL, the problem drives the learning, and students must research, hypothesize, and collaborate to find suitable solution.

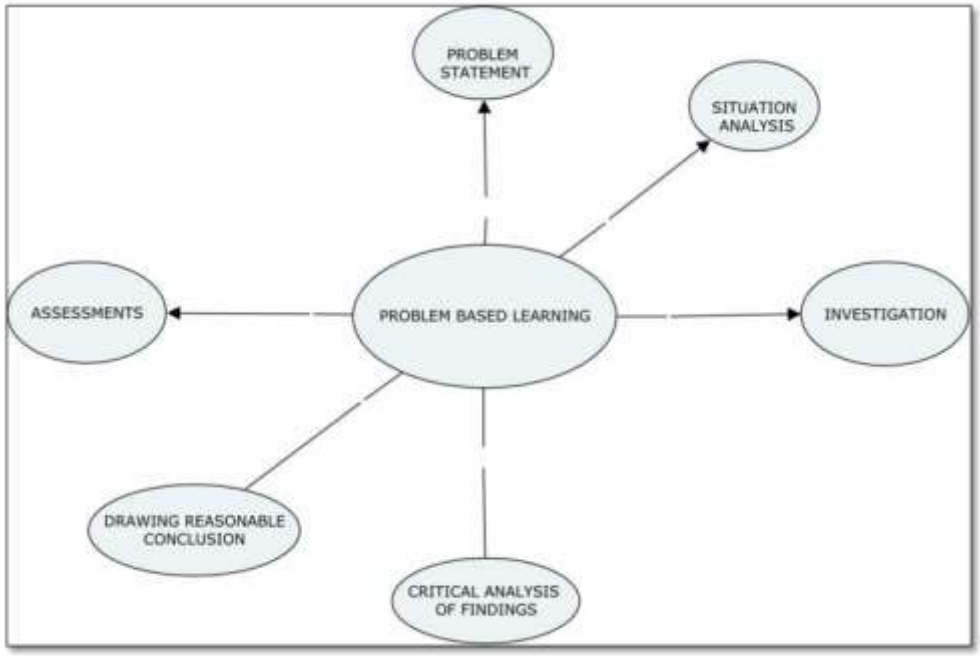

figure 1- elements of pbl source: a democratic way of problem based learning 1 by k. vijesh, & manoj praveen. G

If we look in to how PBL works, i.e., its process, students participate in the process of learning as small groups towards the solution of given ill structured problem given by the PBL teacher. Tan (2002) suggests a '5-step Problem Based Learning process scheme' – 1. Encountering the problem, 2. Learning issues and analysis of the problem, 3. Reporting the information they discovered, 4. Presentation and reflection of solution, 5. Integration, overview, and evaluation

Teacher will be acting mainly as a facilitator rather than being as a typical traditional teacher who focuses on heavy flow of information, memorizing and problems less relatable with daily life. It is evident that PBL will enable the students to take responsibility of their own learning process. The whole process will direct the students towards being a responsible, active learners by developing critical thinking skills and problem-solving ability through investigation of real-world problems/contexts (Egbert, 2009). Studies define PBL to be a method of instruction which applies open inquiry approach in learning process to apply scientific knowledge and principles towards the attainment of solutions of real-world problems (Ketpichainarong, Panijpan & Ruenwongsa, 2010).

For PBL to be truly effective, students should be provided with a structured framework that guide their process of learning. There are various PBL models/strategies proposing different PBL processes. It includes Classic McMaster PBL, Maastricht model of PBL (Wood, 2003), PBL process scheme put forward by Tan (2002) etc.

We will focus on Barrells KWHLAQ strategy which he formulated by improvising Olge's (1986) K-W-L method. It can be seen that the limited scope of KWL method is expanded in a wise manner to give rise to KWHLAQ strategy so that it meets the demands of long-term curricular units of instruction.

III. THE KWHLAQ STRATEGY

3.1 The KWHLAQ Strategy - Explained

KWHLAQ can be considered to be an organizing framework which act as a complete tool to guide student centered learning process of PBL (John Barell, 2007). In other words, we can say, KWHLAQ is a strategy to lead PBL process providing a roadmap for students to reflect on their knowledge and continuously assess their learning journey. It is a six-stage process that helps students structure their learning journey.

K	What do we think we already *know*? Explore prior knowledge.
W	What do we *want* and need to find out?
H	*How* will we proceed to investigate our questions? *How* will we organize time, access to resources and reporting? *How* will we self-assess our progress (such as with a scoring rubric)?
L	What are we *learning* (daily)? And what have we *learned* at the end of our investigations?
A	How and where can we *apply* the results of our investigations—to this and other subjects/to our daily lives?
Q	What new *questions* do we have now? How might we pursue them in our next units?

figure 2: the KWHLAQ approach to inquiry (source:barell 2007)

Each letter in KWHLAQ stands for various key aspects of learning process as follows:

1. K - What do we think we know about the subject?

This stage focusses on assessing the prior knowledge of learners on a given topic. This stage will enable them to activate their pre-existing understanding and helps them to identify existing gaps in their knowledge levels. According to the renowned educationalist David Ausubel, "The most important single factor influencing learning is what the learner already knows." Thus this initial step is very important as it creates a foundation upon which new knowledge can be anchored.

2. W- What do we Want/Need to find out about it?

This is the second step which includes the task of setting learning objectives by identifying what students want/need to know. This stage is in accordance with John Dewey's assertion that "Education is not preparation for life; education is life itself."

This phase ensures that students are engaged with the material and have a clear direction in their learning journey.

3. H – How will we go about finding out? How will we organize ourselves to investigate: use of time, access to resources, and planning for sharing findings?

In this step, students think about what learning strategies they have to adopt or follow, considering the resources, tools and ways they will use to acquire knowledge. This self-directed approach is fundamental to both KWHLAQ and PBL, where the learning process is student-centered. The "H" phase motivates students to think critically about their approach of problem-solving.

4. L - What do we expect to Learn? What have we learned?

After engaging with the learning resources, tools and ways, students think up on what learning outcomes are expected out of this learning process. This stage is critical for combining knowledge and recognizing areas of improvement. By considering on reflection, the KWHLAQ strategy make sure that students not only gain information but also get a understanding of the subject matter in a deeper and meaningful manner so that they critically think on extended contexts related to the subject matter.

5. A – How will we Apply what we have learned to other subjects? to our personal lives? to our next projects?

In the fifth stage, students are stimulated to inquire deeper based on their learning. This encourages for continuous inquiry and the development of higher-order thinking skills as well.

6. Q- What new Questions do we have, following our inquiry?

The final stage of the KWHLAQ strategy include questioning focusing on what comes next. It motivates students continue to be curious and open to further learning on the subject of matter under consideration, which is nothing but the essence of principle of lifelong learning.

(Barell, 2007)

3.2 Synergies Between KWHLAQ And Problem-Based Learning

The KWHLAQ strategy complements PBL by acting as a framework for problem-solving process in such a way that it obeys the principles of PBL.

Each stage of KWHLAQ can be examined on how it aligns with the principles of PBL:

1. K - What do we think we know about the subject?

In Problem Based Learning, students are provided with an ill-structured problem related to real life but left without being given clear instructions on how to find its solution. The "K" stage of KWHLAQ enables students to activate their pre-existing knowledge which is related to the problem in some way, which in turn is a critical first step in problem-solving. For example, if students are provided with a task with finding a solution for a real-world environmental issue, they begin the problem-solving process by recollecting what they already know about different climatic aspects such as climate change, pollution, or conservation efforts.

2. W- What do we Want/Need to find out about it?

The "W" phase helps the students to recognize gaps in their pre-existing and required knowledge levels which ultimately leads to setting of learning objectives. In a PBL situation,this phase of KWHLAQ exhorts students to investigate on the necessary knowledge/skill which students have to possess for solving provided ill-structured problem. This stage also enables the students to be self-centered; one of the main principle of PBL method.

3. H – How will we go about finding out? How will we organize ourselves to investigate: use of time, access to resources, and planning for sharing findings?

It is this phase of KWHLAQ which gives students a chance in a PBL environment decide in what way or how how they will gain the knowledge/skills necessary for solving the ill-structured problem. For example, students may decide to refer academic journals/books, carry out experiments etc. through which the student feels that they can come to know about the solution or at least a hint towards it. By giving students, the freedom to choose learning methods by their own, the KWHLAQ strategy supports the concept of individualized learning; which is a main principle of PBL.

4. L - What do we expect to Learn? What have we learned?

After carrying out investigation and solving the problem provided in PBL scenario, students reflect on what they have learned. This reflective process is essential for knowledge consolidation in both KWHLAQ and PBL. Reflecting on their learning helps students identify what concepts they have mastered and which areas still need improvement. This phase is critical for transforming raw information into usable knowledge.

5. A – How will we Apply what we have learned to other subjects? to our personal lives? to our next projects?

In PBL, provided problems seems to be complex and multi-disciplinary, leaving scope for extended. The "A" phase of KWHLAQ motivates the students to continue their investigation on where the found out solution can be applied further thereby satisfying the PBL principle of extended inquiry. questions, driving deeper engagement with the material.

6. Q- What new Questions do we have, following our inquiry?

The "Q" phase encourages students to formulate new questions for future learning in PBL, underpinning the cyclical nature PBL. It becomes evident in the PBL process that the solutions for given problem problem often leads to solving new challenges and areas for exploration through act of questioning.

CONCLUSION

In conclusion, the KWHLAQ strategy can be considered to be an effective strategy for the successful implementation of Problem-Based Learning. If KWHLAQ is not integrated in Problem Based Learning method, then PBL remains as a powerful concept left with no structured approach and guidance

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