

# Effects of Problem-Based Learning in Teaching and Learning of Technical and Vocational Education and Training.

Sada, A. M, Mohd, Z. A., and Adnan, A. and Audu, R

Faculty of Education, Universiti Teknologi Malaysia, 81310, Johor Bahru, Malaysia.

**Abstract-** Problem-based learning (PBL) has been accepted for instruction in many fields of study since it was first introduced in medical field during the 1960's. However, this innovative teaching and learning approach is yet to be recognized in technical vocational education and training (TVET) teaching and learning in some countries. This paper discusses briefly the concept, effectiveness of PBL approach in teaching and learning in TVET. Based on the literature review, the paper concludes that, PBL is an essential tool for instructing learners in technical and vocational trades.

**Index Terms-** PBL, teaching and learning, TVET.

## I. INTRODUCTION

The effectiveness of all education system depends largely on the quality of teaching and learning in the classroom, workshops, laboratories and other places where education takes place [1]. For effective teaching and learning to take place, skilful teachers need to use variety methods and techniques at their disposal. There is a wide diversity in teaching methods and techniques, no one method can be regarded as the best for every teaching situation [2, 3]. The decision to apply one method or another depends on a number of factors, including the teacher, the learner and the environment. It is the responsibility of the teacher to assess the situation and decide on which method or methods to use in order to accomplish the instructional objectives. The success or failure of teaching and learning depends on the inventiveness, approach and method employed by the teacher. This could also depend on an intelligent analysis of the educational purpose, the learners in the class, the curriculum content and the type of subject matter being taught.

Research conducted by [Okoye [4] Ogwu [5], Ogwo and Oranu [6] reported that no single teaching method can be said to be the most appropriate in teaching technical and vocational subjects. Petrina [7] also has the opinion that, goals cannot be achieved by a single teaching method, nor can anyone teaching method accommodate all learning styles at once; for example, demonstrations or projects are suitable for meeting some goals but not effective for meeting others. However, in TVET, most instruction is work-oriented [8]. For this to be achieved, learners must be exposed to active teaching approaches such as PBL. The participation of learners in instruction in any technical and vocational trades must be active and direct. Direct participation exists where the learner is physically involved in the academic and practical activities in that trade. The learner must be

particularly affected and exhibit positive perceptions and behaviours that indicate the attainment of the desired goals. Accordingly, the PBL approach influence the effectiveness of teaching and the ease of learning in TVET [4].

## II. THE CONCEPT AND OVERVIEW OF PBL

PBL has been defined by different authors. According to Savery [9] PBL is defined as an instructional (and curricular) learner-centred approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem. PBL is an approach to instruction that prepares learners for real-world experience and causes them to learn how to research [10]. Mergendoller, Maxwell [11] explained that, PBL provide a more challenging, motivating and enjoyable approach to education. Furthermore, PBL is a subset of the problem-centred learning approach which is easily identifiable by the use of typically ill-structured problems which lead to ownership of the learning environment [12]. Bansal and Kumar [13] referred to the PBL package as an innovative, interesting and corroborated classroom transaction activity.

PBL has certain definite features as outlined by [10], Boud and Feletti [14]. It is a learner-centred learning process; learners collaboratively construct their own learning goals and knowledge base

- i. It is a small-group process
- ii. It is led by a facilitator rather than a teacher
- iii. Problems are set as a starting-point for learning and used as a tool for learners to build upon shared prior knowledge

## III. PBL IN TVET TEACHING AND LEARNING

Increasingly, learners who are being taught using traditional methods appear to be disconnected from their studies [15]. The characteristics of the millennium generation include 'digital literacy, experiential and engaging learning, interactivity and collaboration, immediacy and connectivity' [16]. Education can no longer be exclusively based on the teacher "disseminating information/knowledge through lectures and PowerPoint slides" [17]. Shift away from the teacher-centred learning paradigm means moving to a more learner-centred constructivist paradigm of education. The learner now needs to focus on understanding, constructing knowledge, discovering and active engagement

whereby they view the teacher or lecturer as a mentor or guide [11].

Learning is not done in isolation; learners learn by doing [18]. They prefer to work in groups and they embrace collaborative learning [18]. They actively participate in the learning process, but more importantly, they are looking for direction, mentoring, guidance, feedback and good communication channels [19]. PBL incorporates this approach by offering a holistic approach to teaching and learning and may well provide for greater flexibility in teaching design. The focus of educators should be on engagement and discussion, allowing learners to contemplate the material put forward, as well as to comment and question. PBL allows educators to do just that. Industry is telling the education sector they need graduates who are job ready, who are able to be productive immediately and who have a good understanding of the business they are about to be employed in. Industry also wants graduates who can be productive in the workplace from day one, so there is a clear need for PBL in the TVET sector to ensure that the needs of industry are fulfilled [20].

The need for PBL in TVET teaching and learning stem from the fact that teaching and learning in TVET has to do with world of work and the practical application of learning and skills. The emphasis in approach has also shifted away from teaching content and more towards facilitating learning and empowering learners. Particularly, in this new knowledge era, the workplace contains more complicated and sophisticated high-tech equipment and computerized systems, which create more complex and ill-structured problems (Tan et al., 2009; Zhou, 2012a).

#### IV. EFFECTIVENESS OF PBL IN TECHING AND LEARNING IN TVET

The PBL approach has proven to be effective in the teaching and learning of technical and vocational trades. PBL has been claimed to encourage deep learning in learners [21]; [22] & [23]. PBL leads to the increased use of meaningful “deep” approaches by learners in relating to the material and the decreased use of reproductive “shallow” approaches. PBL also offers opportunities for learners to learn in teams, develop presentation skills, learn negotiation abilities and develop research skills and many other abilities [21]. Furthermore, in an environment of an increased number of learners decreased resources and overextended teachers, PBL is seen as an alternative approach to teaching a larger number of learners using less face-to-face contact [21]. [Robbs and Meredith \[24\]](#) list a number of advantages that are associated with PBL modes of learning as an alternative to traditional methods:

- An increased retention of information;
- The development of an integrated (rather than discipline-bound) knowledge base;
- An encouragement towards lifelong learning;
- A greater exposure to expert experience and at an earlier stage in the curriculum;
- An increased learner-teacher liaison; and
- An increase in overall motivation.

According to [Force \[25\]](#) and [Gravells \[26\]](#), PBL is the most effective active learning method known to make a positive impact on the learners’ experience. PBL is particularly effective in supporting learning, helping learners to move from surface learning to deep and profound understanding. This approach is generic and be applicable to all technical and vocational trades programmes. Furthermore, [27]; [28] posit that integration of PBL in TVET will definitely reduce the gap between theory and practice, simply because PBL provides engaging and challenging learning materials and flexible space for learning through activity. It is therefore that we should work hard to help students make the connections between the micro and the macro, between the everyday details of their lives and the broader world in those details that finally do make a difference.

#### V. CONCLUSION

Using the PBL approach in teaching and learning in TVET will accelerate the learners’ high level skills in communication and information retrieval which will enable individuals to gain and apply new knowledge and skills as needed. Adapting PBL as teaching approach, will help learners to develop the ability to arrive at informed judgments by effectively defining problems, gathering and evaluating information related to those problems, and developing solutions; the ability to function in a global community; adaptability; ease with diversity; motivation and persistence (for example being a self-starter); ethical and civil behaviour; creativity and resourcefulness; technical competence; and the ability to work with others, especially in team settings. Lastly, learners will demonstrate the ability to deploy all of the previous skills to address specific problems in complex, real-world settings, in which the development of workable solutions is required. Given this set of opportunities from using the PBL approach in teaching and learning in TVET and the apparent success of the PBL approach at producing graduates with these characteristics, it is hoped that the use of PBL in TVET teaching and learning will continue to receive support.

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#### AUTHORS

**First Author-** Sada, Adamu Maigari, B.Ed. (Tech), (ABU), Zaria, Nigeria, M.Ed. (Tech), (UTM); PhD Student Universiti Teknologi, Malaysia (UTM), 81310, Johor Bahru, Malaysia., Email- [sadamaigari67@yahoo.com](mailto:sadamaigari67@yahoo.com) or [amsada2@gmail.com](mailto:amsada2@gmail.com), +60166120954.

**Second Author-** Mohammad Zolkifli Bin Abdul Hamid, B.Sc. (Hons), Dip. Ed (PG0, M. Ed., PhD., Universiti Teknologi, 81310, Johor, Bahru, Malaysia, [mohdzol@utm.my](mailto:mohdzol@utm.my), +60137783990.

**Third Author-** Adnan Bin Ahmad, B.Ed., M.Ed., PhD. [nanjb19@yahoo.com](mailto:nanjb19@yahoo.com), +60189680804, Universiti Teknologi, 81310, Johor Bahru, Malaysia.

**Fourth Author-** Audu Rufa'i, B. Ed., M. Ed., (FUT), Minna, Nigeria, PhD (UTM), [audu.rufai@yahoo.com](mailto:audu.rufai@yahoo.com), +2348033174958.

**Correspondence Author-** Sada, Adamu Maigari, B.Ed. (Tech), (ABU), Zaria, Nigeria, M.Ed. (Tech), (UTM); PhD Student Universiti Teknologi, Malaysia (UTM), 81310, Johor Bahru, Malaysia., Email- [sadamaigari67@yahoo.com](mailto:sadamaigari67@yahoo.com) or [amsada2@gmail.com](mailto:amsada2@gmail.com), +60166120954.