

What is Inquiry-Based Learning?

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## Inquiry-Based Learning

### Introduction

The education process is ever changing due to the new teaching methods that are developed. The inquiry-based learning is generally an instructive education technique that was discovered in the mid-19<sup>th</sup> century to improve traditional forms of teaching. The method is based on several theories such as Vygotsky, Dewey, and Piaget. Students engage in different learning processes in inquiry-based learning. In this technique, learners should create queries, acquire substantiation to react to the questions, and explicate the evidence collected (Ernst, Hodge and Yoshinobu, 2017). Learners are also expected to plan possible descriptions and create predictions for future study. Science students incorporate inquiry-based learning to boost knowledge and education skills. Investigation and experimentation skills of the students are improved by the use of these techniques. Technology-based approaches initiated in the contemporary world provide students with an excellent opportunity to advance inquiry-based learning. The technology-enhanced learning is building a good environment for inquiry-based learning among the science students.

### The Literature on Inquiry-Based Learning

Ozel and Luft (2012) note that the science curriculum emphasizes on education reforms that promote inquiry-based learning among the students. In their publication, “*beginning secondary science teachers’ conceptualization and enactment of inquiry-based instruction*,” the authors agree that science teachers play a critical role in helping students to develop inquiry skills during the learning process. However, some studies do not concur with the idea and claim that science teachers do not adequately endorse inquiry-based science instruction. The problem is linked to various orientations made by the teachers about the inquiry practices. The teachers’



conceptions of inquiry-based learning determine whether they embrace and implement the technique in the classrooms (Ozel and Luft, 2012).

The discipline specified by teachers determines their ability to conceptualize and incorporate inquiry-based learning. The more the teachers are introduced to the teaching practice of inquiry-based learning, the better they shall intellectualize the teaching system (Ozel and Luft, 2012). The education programs are crucial to the science teachers who help them gain adequate knowledge on the inquiry-based learning. Thus, after some time, the teachers can translate inquiry-based instruction in a classroom environment. According to Ernst, Hodge, and Yoshinobu (2017), new science teachers need a deep understanding of the inquiry-based learning and how to it in a classroom environment. The new teachers need appropriate opportunities to develop their skills and knowledge in the learning system.

Kazempour (2009) conducted a study to establish the impact of this method of learning to knowledge acquisition. According to the author, the inquiry-based approaches through investigation and experimentation are motivating students in the field of science. Apart from the motivational benefit, the inquiry learning process has its value such as generating knowledge to the teachers and the students. The technology-based approaches applied currently in science education provide students with good inquiry opportunities in learning (Kazempour, 2009). The approaches provide an interactive session between students and teachers which improves the learning activities. The learning process becomes successful when the inquiry-based learning is properly structured.

A study by Vreman-de Olde, de Jong and Gijlers (2013), titled “*learning by designing instruction in the context of simulation-based inquiry learning*” establishes that the ability of the students to create scaffolds to encourage learning through simulation is not substantial.



Simulation is based on the impression that before the teachers engage in teaching, they should be conversant with the inquiry-based learning principles. Instructors gain knowledge from the teaching experience. Vreman-de Olde, de Jong, and Gijlers (2013) note that when new teachers use inquiry-based learning in a classroom environment without proper understanding, they fail to deliver the anticipated content to the learners. Tutors should not engage in learning through teaching because of a high probability of the teachers to mislead the students. The new science teachers should conceptualize on the inquiry-based learning before applying the technique in a class (Vreman-de Olde, de Jong, and Gijlers, 2013).

The science students should understand that the inquiry-based learning involves several activities that aim to boost their skills and knowledge on particular science courses. Subramaniam, (2010) explores this assertion in the article titled “*integrating writing frames into inquiry-based instruction*.” The ability to observe, conduct research and interpret findings requires the skills of reading and writing science (Subramaniam, 2010). Through the process, the learners end up developing inquiry and cognitive skills that help them in learning. The teachers also have a crucial role to play in ensuring the students acquire the right skills and knowledge in inquiry-based learning. Writing frames is a method used by the teachers to improve inquiry-based learning among the learners. The technique improves the scientific literacy of the learners and builds their skill and knowledge regarding a specific field.

A writing frame comprises of sentence modifiers and critical information that coherently communicates ideas. The nature of writing frames provides a framework on different genres of scientific writing. The tutors teach the students on critical conventions used in a scientific environment (Subramaniam, 2010). The language information presented in writing the frames helps students understand the topic before the learning process begins. Thus, science teachers



should plan for the inquiry-based learning since most lessons require the students to have science-literacy knowledge in advance.

On the other hand, Pea (2012) investigates the role of environment in the use of inquiry-based learning. In the publication titled, "*does school environmental context matter*" the author states that school environmental factors affect the inquiry-based science instruction. The school settings such as social-cultural and human factors influence the development of inquiry-based learning (Pea, 2012). Previously, there was an apprehension of whether these aspects affect the acquisition of inquiry-based learning among the tutors and the students. Science curriculum is based on inquiry-based teaching, and when the process is not achieved, the teaching techniques become ineffective. Both teachers and the students should have a supportive environment which steers them to make their teaching and learning goals respectively.

The school environmental context factors can have positive and negative impacts on the teachers and the learners. Some factors such as inadequate facilities negatively impact on the teachers' ability to use inquiry-based teaching in a class (Pea, 2012). Parents play an important role in students' education success when they fail in their mandate to support them; tutors find it problematic to achieve their targets. According to Pea (2012), learners' success in school is determined by various aspects that include the capability of tutors, learning environment, and available facilities.

Teaching profession requires particular skills and practices that should be developed. Kazempour (2009) notes that tutors should use proper teaching techniques to ensure the students succeed in their education. Students are encouraged to engage teachers through questions and discussions to develop skills and knowledge in a particular field. Inquiry-based learning incorporates many active teaching activities that the teachers should embrace. Collaboration



between teachers and the students is a vital aspect that shapes the success of inquiry-based learning (Ernst, Hodge and Yoshinobu, 2017). Group work among the learners is also a form of collaboration that boosts understanding among them. The students engage in group discussions and presentations that enable the tutor to gauge student ability on a specific field taught. The existence of many inquiry-based learning techniques improves students in other areas such as mathematics and language.

Ernst, Hodge, and Yoshinobu (2017) note that the inquiry-based learning is emphasized by science organizations that advocate for the reforms on education. The technique encourages the students to express themselves and build knowledge in a particular science field. The teachers should pay attention to the students learning abilities, identify weaknesses and provide a session for improvement. According to Subramaniam (2010), prior understanding and experience of a learner before enrollment to this type erudition should be determined to allow the students to take an active role in their learning through reflection and first-hand experience. Vreman-de Olde, de Jong, and Gijlers (2013) point out that the development of inquiry-based learning is a promising technique that can improve student performance in different edification levels. However, the incorporation of the changes should consider teacher beliefs and student capabilities.

### Conclusion

Inquiry-based practice is embraced in science education to assist the students in developing skills and knowledge in the specific fields. Different studies reviewed in this discussion reveal that inquiry-based education is an essential learning technique in the contemporary world. Tutor conceptions regarding the practice have an interminable influence on the quality of teaching and learning. The studies reveal that new teachers that lack adequate



knowledge of inquiry-based learning struggle in helping students adopt the practice. The learning environment also determines how inquiry-based learning develops the skills and knowledge of the students. However, teachers have the opportunity to gauge the students' capability in a particular field through inquiry-based practice to understand their knowledge about a specific area.



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