

How to Create Amazing Teacher Competency in Fink's Taxonomy in Science Subjects?

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Abstract

Fink's Taxonomy is defined as a learning model that develops student engagement, integrates students through a deep emotional level, and is self-directed. Fink's Taxonomy, which is built with elements interacting with one another, allows teachers to apply the taxonomy to create significant learning. However, not many discussions are debating the issues related to Fink's Taxonomy in Science subjects in the context of secondary schools. There are three main issues of Fink's Taxonomy implementation expressed in this concept paper such as (i) teachers have no or only a little knowledge about Fink's Taxonomy, ii) there are no policies and guidelines from the Ministry of Education Malaysia, and (iii) the ambiguity of Fink's Taxonomy measurement in Science subjects in the context of secondary schools. This concept paper is unique because it elaborates on the issues faced in the implementation of Fink's Taxonomy for Science subjects in the context of secondary schools. This study suggests that the implementation of Fink's Taxonomy should be done to create significant learning in Science subjects. This paper needs to be given attention so that many researchers and the community become more aware of Fink's Taxonomy by taking immediate action to systemize the implementation and measurement of the taxonomy. The proposed solutions can be developed through active research related to Fink's Taxonomy, the provision of implementation guidelines by the Ministry of Education Malaysia, and the support of schools in creating significant learning.

Keywords: Fink's Taxonomy, Science, Significant Learning, Secondary School, Implementation

Introduction

Effective teaching is a process of delivering information, which creates an atmosphere that provides motivation and improves learning in students. The effective teaching of teachers can be evaluated through the competence of teachers in encouraging the active involvement of students in class and situations where students can practice what they have learned (Ahmad & Azman, 2020). According to Fink (2003), effective learning occurs when there is a clear and permanent change in students. However, a boring teaching method (Uribe & Pardo, 2020) and traditionally assigned tasks (Coco, 2012) cause students to lose interest and motivation to learn. Bloom's Taxonomy, which is commonly used to produce clear and measurable teaching and learning objectives as well as a hierarchical pattern, is unable to guide interactive learning activities and designs. As stated by Partido, Chartier, and Jewell (2020), the lack of intrinsic, instrumental, and achievement values, especially when the

hierarchical pattern in Bloom's Taxonomy must be mastered from a low level in order to pass to the next level, as well as too many standards and basics that must be achieved (Mandur et al. 2021) have made effective learning difficult for teachers. Teaching strategies and methods that trigger critical, creative, and practical thinking are the factors influencing the effectiveness of Science teaching. Thus, the implementation of Fink's Taxonomy in Science teaching is introduced.

Billiot & Forbes (2020) defined Fink's Taxonomy as a cyclical learning model that develops student engagement, connects students to a deep emotional level, and makes students self-directed. Fink's Taxonomy, which comprises elements that interact with one another, allows teachers to apply the taxonomy to produce significant learning. The advantage of Fink's Taxonomy over Bloom's Taxonomy is that Fink's Taxonomy emphasizes metacognitive and affective aspects that are not present in Bloom's famous taxonomy. Furthermore, the integration of Fink's Taxonomy into Science teaching methods with elements of application and integration that implement critical, creative, and practical thinking in connecting ideas and views is also able to improve the competence and effective teaching of teachers.

As evidenced in the literature, many studies have been conducted to examine the integration of Fink's Taxonomy into the teaching pedagogy that investigates teacher competence (DeLuca et al., 2021) as well as learning tasks and their relationships with significant learning (Su, 2022; Odom et al., 2017); however, the findings of each study are different. There are also studies that measure student empathy with the implementation of courses that incorporate Fink's Taxonomy (Billiot & Forbes, 2020) as well as studies that only examined students' reflections after undergoing a course that incorporates Fink's Taxonomy (Barnes & Caprino, 2016). Therefore, based on the varying findings of different studies, further research must be carried out in different contexts. In this regard, the use of Fink's Taxonomy is deemed suitable for this study because Science subjects require effective teaching methods that can trigger critical, creative, and practical thinking.

This study provides a significant exciting opportunity to advance our knowledge of Fink's Taxonomy by exploring the potential of this taxonomy to enhance student performance in Science subjects. Therefore, this study makes a major contribution to Fink Taxonomy's body of knowledge by expanding the systematic review of Fink's Taxonomy research by focusing on the trends of research development all over the world. This project provides an important opportunity to advance one's understanding by systematically reviewing the recent papers on Fink's Taxonomy in Science subjects according to the specific trends. The study offers some important insights into the focus group of students, teachers, and administrators by giving a sort of idea on how to empower students' development and strength on Fink's Taxonomy when facing challenges in Science subjects. This review has a high need for bits of intelligent theoretical development such that a systematic literature review can arrange the trends of Fink's Taxonomy in Science subjects effectively. This will help others to obtain a better picture of implementing parts of the taxonomy efficiently. Fink's Taxonomy must be investigated to avoid the domination of Bloom's Taxonomy for all subjects when other taxonomies are available. Thus, we need to know about the growth of Fink's Taxonomy in Science subjects by reviewing the knowledge development because the Higher Order Thinking Skills in Science subjects may change the implementation of Fink's Taxonomy to be more dynamic in the

future. The Ministry of Education (MOE) also needs this information in order to do some intervention and profiling for improvement purposes.

Literature Review

Fink's Taxonomy can be defined as an integrated approach that helps teachers create learning experiences that will cause significant changes in students (Levine et al., 2008). The basis of Fink's Taxonomy approach focuses on the development of goals based on a taxonomy that does not depend only on memorization or the application of skills but also self-reflection and students' awareness of responsibility for self-learning. The uniqueness of Fink's Taxonomy structure, which is not hierarchical but circular, is more interactive in that each type of learning can stimulate other types of learning (DeLuca et al., 2021). Besides, Fink's Taxonomy is typically a framework that produces high-impact and student-centered learning experiences and emphasized all elements of Fink's Taxonomy simultaneously (Pampel, 2018).

In addition, other definitions are also given; for instance, Fink's Taxonomy can serve as an approach for teachers to maintain a balance between academics and personal development as well as a guide for teachers' self-reflection (Barnes & Caprino, 2016). Next, Krueger, Russell, and Bischoff (2011) defined Fink's Taxonomy as a framework that stimulates deep and continuous interest in a subject. The feeling of interest will attract students' inclination to a subject and produce changes in themselves. Learning is said to occur if there is a change in students, and if the change is sustained, then significant learning has occurred.

The study of Fink's Taxonomy in the context of teacher competence proves the positive contribution of integrating Fink's Taxonomy into teaching pedagogy, which results in significant student learning (DeLuca et al., 2021). In a study by Odom, McKee, and Dunn (2017), Fink's Taxonomy integrated with the tasks constructed by teachers helped produce significant learning among students. Fink's Taxonomy also serves as a framework in the preparation of engineering education course design and goals by teachers (Apul & Philpott, 2011), as well as a guide to the formation of learning goals for mental health that focuses on learning elements such as integration, caring, and human dimensions (Keating et al., 2019).

On the contrary, in a study by Barton et al (2020), Fink's Taxonomy was used to analyze interview data on employee evaluation practices. This is similar to a study by Kusumawardani et al (2014), which used Fink's Taxonomy integrated with engineering course design to evaluate e-learning using semantic technology. Given the numerous past studies on the integration of Fink's Taxonomy into teaching pedagogy that can produce significant learning and measure teacher competence, it is evident that Fink's Taxonomy has a significant impact on teacher competence and significant learning, especially in Science subjects. However, studies in the context of Science are still lacking and must be explored further.

Studies related to Fink's Taxonomy have been conducted abroad since it was introduced by L. Dee Fink in 2003. There are many recent studies on Fink's Taxonomy (Su, 2022; DeLuca et al., 2021; Mandur et al., 2021; Mukdaprasert & Chalauisaeng, 2021; Barton 2020; Partido et al., 2020; Faisal 2020; Billiot & Forbes 2020; Uribe & Pardo 2020; Branzetti et al. 2019; Keating et al. 2019; Pampel 2018; Odom et al., 2017); however, recent studies on Fink's Taxonomy in Malaysia are very limited. Faisal (2020) conducted a study of Fink's Taxonomy in the context of Science in Pakistan and evidenced that most students demonstrated poor Science

competence. This is due to the attitude of students who did not care about Science subjects, stemming from inefficient pedagogy by teachers who were still using traditional teaching methods. Therefore, teachers or researchers should always try to find a more appropriate way to make the learning process more meaningful. On the other hand, the findings of the study also showed that the experimental group taught using pedagogy integrated with Fink's Taxonomy demonstrated confidence, enjoyed being in the class, and began to care about the content and the entire learning process, besides thinking beyond what was learned in class. The same scenario actually happens in Malaysia; the difference is that there has not been a study on Fink's Taxonomy in the context of Science.

Thus, the discussion of this topic allows for the identification of issues related to the implementation of Fink's Taxonomy for the subject of Science in the context of secondary schools. Sadly, the issues of Fink's Taxonomy implementation do not seem to receive attention in the field of education in Malaysia; therefore, some issues have been identified regarding the implementation of Fink's Taxonomy and further studies will assist in a deeper exploration of the issues related to Fink's Taxonomy implementation in education.

Underpinning Theory

Theory is a basic matter that is the basis for the formation of science. Sihes (2008) defines learning theory as an assumption or hypothesis by psychologists about the meaning of learning, how learning occurs, and the factors that influence the process. Learning theories are the basis of the current teaching and learning concept and process. Examples of learning theories are Behaviorism, Cognitive, Constructivism, Humanism, and Connectivism.

Behaviorism learning theory is the most common and often discussed theory in the world of education. Behaviorism learning theory is a learning theory related to behavioral changes (Abdul Jobar et al., 2021) which focuses on the relationship between stimulus and response. Learning begins when there is a response to a given stimulus. Reactions or behavioral responses towards the surrounding stimuli produce different consequences, depending on whether the consequences are either positive or negative reinforcement (Abdul Aziz et al., 2022). Advocates of Behaviorism learning theory explain that the teaching and learning process will influence the actions and behaviors of students positively or negatively and such behaviors can be observed, controlled, and predicted (Sihes, 2008).

Cognitive learning theory is associated with the thought process that allows humans to acquire, detect, store, achieve and recall prior knowledge for reuse (Hussin, 2013). Abang Tar and Mahmud (2021) define learning theory as a mental process that encompasses observation, knowledge, and understanding that has an impact on behavior. Mental process means a process that occurs in the brain to enable a person to master thinking skills and focus on phenomena such as perception, concept building, reasoning, evaluation, learning, and problem-solving (Hussin, 2013). This is in line with the main focus of Cognitive learning theory, which is about how the learning process takes place and how a learning method interacts with activities that transpire in the student's thinking. Cognitive learning theory also emphasizes the processing of information that occurs in the student's mind as the teaching and learning process is being implemented. The learning process is regarded to take place if students are actively involved in understanding and interpreting the lessons delivered by the teacher.

Next, Constructivism learning theory is a notion in which students are portrayed as builders of knowledge or concepts actively based on their existing knowledge and experience and that they are not solely receiving input from the teacher (Tar & Mahmud, 2021). Through Constructivism learning theory, students will develop knowledge from knowledge construction when they understand the knowledge given (Seven et al., 2017). Voon and Amran (2021) support this claim in their study that students will organize the knowledge received with existing knowledge to form a new understanding. In addition, constructivist learning theory has strong implications for cooperative learning, where students as group members have the opportunity to play their respective roles in the group. Besides, students will solve problems together and emphasize on social interaction between peers and teachers. Similarly, the Malaysian Ministry of Education (MOE) has also emphasized that cooperative learning based on the Constructivism learning theory is able to strengthen the 21st-century teaching among teachers (Hamzah & Nasri, 2020).

Humanism learning theory states that humans have an advantage, inner power or talent within themselves that will have an impact on them and potentially make the individual a great person and contribute to the surrounding society (Zainal, 2008). The potential that exists in the individual will foster self-esteem and help develop the individual's potential. Abang Tar and Mahmud (2021) assert that when an individual receives a good stimulus unplanned (unconditional positive regard), the individual will also respond positively. Likewise, if students are in a conducive school environment, where the teachers and friends can provide support and positive stimulation, this can tremendously improve their self-esteem.

Connectivism learning theory is a new learning theory that covers the learning process in today's digital era (Jamaludin et al., 2022). Among the several principles of the Connectivism learning theory in the study of Siemens (2005) is that the learning process takes place by connecting information sources obtained through informal learning from social media in specific nodes. In addition, learning can also happen outside of one's self which means the ability to learn something new is seen as more important than existing knowledge. Connectivism learning theory also emphasizes the need to maintain the relationship of the learning network to ensure that learning can be carried out continuously and able to see the relationship between various fields, ideas, and concepts (Hisham & Kutty, 2021). There is no doubt that the Connectivism learning theory has created new opportunities for students to learn and share information with each other and across the network of websites. Therefore, students need to wisely determine whether the information is suitable and valuable for use or otherwise, and also select and filter information in the face of information density (Siemens, 2005).

The two theories most closely related to Fink's Taxonomy in Science learning are Cognitive learning theory and Constructivism learning theory. Cognitive learning theory supports Fink's Taxonomy through the teacher's emphasis on students' thought processes that allow information acquisition, promote memory, motivate students, and encourage problem-solving (Hussin, 2013). This means that when a student experiences the teaching and learning process of Science subjects, every knowledge and experience received will be stored in short-term or long-term memory. The process that occurs in the mind of the student is illustrated through the change in behavior in the student. If there is a permanent change, it proves that learning

has taken place (Hussin, 2013) as in Fink's study which explains that effective learning has existed when there is a clear and permanent change in the student.

The competence or efficiency of the teacher is also seen when the teacher encourages students to use intuition, imagination, and creativity actively (Abang Tar & Mahmud, 2021) in learning the subject of Science. The *Application* element in Fink's Taxonomy which means that students have critical, creative, and practical thinking so that they can solve problems is in line with effective teaching strategies by teachers through cognitive learning theory, that is through the centralization of teachers, students, and materials that will help teachers produce creative students, innovative and knows how to solve problems in an efficient way (Hussin, 2013). In addition, Cognitive learning theory also allows teachers to encourage students to play an active role in restructuring, organizing information received, and making their own interpretations (Ahmad et al., 2020). This allows students to connect new information with previous knowledge and experience and also helps students understand Science subjects more easily and able to retain information for a long period of time.

Constructivism learning theory supports Fink's Taxonomy through the competence and wisdom of teachers using approaches that suit students' abilities and interests to help build new concepts and knowledge in learning (Voon & Amran, 2021), especially in Science subjects. The *Learn how to learn* element in Fink's Taxonomy means to develop the ability to learn efficiently and effectively in lessons is supported by the Constructivism learning theory which encourages students to be more confident, have more social skills, and have more fun in activities done and increase students' interest in learning (Voon & Amran, 2021). Students also feel valued when given the opportunity to carry out independent learning in line with the function of the *Learn how to learn* element, which is to develop the ability to learn efficiently and effectively (Abang Tar & Mahmud, 2021).

Issues and Discussion

First Issue: Teachers have no or little exposure to Fink's Taxonomy

There are various issues that hinder teachers from implementing Fink's Taxonomy for Science subjects in the secondary school context. One of the main issues is that teachers have no or little exposure to Fink's Taxonomy. In general, there are various types of taxonomies that have been developed for use in the field of education. Bloom's Taxonomy is seen as the most famous taxonomy (Li & Maat, 2022) because it has long been known and practiced by educators. As a result, teachers have no exposure to other taxonomies such as Fink's Taxonomy. However, for teachers who are familiar with Fink's Taxonomy, issues arise when the teachers are less skilled and do not master the elements of Fink's Taxonomy (Uribe Cantalejo & Pardo, 2020). This issue began to be highlighted in recent years when more and more academics began to criticize the shortcomings of Bloom's Taxonomy (Berger, 2018; Lemov, 2017) and attempt to look at other taxonomies. Fink's Taxonomy, which can be seen as an alternative to Bloom's Taxonomy, has been introduced to teachers in schools. However, teachers tend to experience difficulties in implementing Fink's Taxonomy into the teaching of Science subjects due to their low level of mastery of Fink's Taxonomy. Besides, teachers who have been serving for a long time are also not ready to change the implementation of Fink's Taxonomy because they are more accustomed to practicing Bloom's Taxonomy.

Second Issue: No policies and guidelines from the Ministry of Education (MOE) Malaysia

In addition, the second issue highlights the absence of policies and guidelines from the Malaysian Ministry of Education (MOE). Evidently, it is difficult for educators to implement Fink's Taxonomy for Science subjects in the context of secondary schools because there are no policies or guidelines from the MOE regarding the introduction or implementation of Fink's Taxonomy. However, there are many criticisms of the weaknesses and limitations of using Bloom's Taxonomy, which is deemed not suitable for the current education system (Masrom et al., 2018). This can be proven by the criticisms of Bloom's Taxonomy in recent studies. Furthermore, without guidelines from the MOE regarding the implementation of Fink's Taxonomy, teachers will also not receive support from administrators, and this causes teachers to be demotivated in implementing Fink's Taxonomy.

Third Issue: Fink's Taxonomy measurement ambiguity in Science subjects in the secondary school context

The third issue is the ambiguity of the measurement of Fink's Taxonomy in Science subjects in the secondary school context. Bloom's Taxonomy is deemed easier to implement because it has been practiced for a long time. However, teachers are moving towards a change in the use of a better taxonomy with an interactive and holistic measurement that is compatible with the latest education system, namely Fink's Taxonomy (Faisal, 2020). When implementing measurements using Fink's Taxonomy, teachers are not clear about how to use Fink's Taxonomy measurement in Science subjects, particularly in the context of secondary schools because they do not have a clear guide in Fink's Taxonomy measurement. In addition, this ambiguity also refers to students achieving Fink's Taxonomy in their learning process.

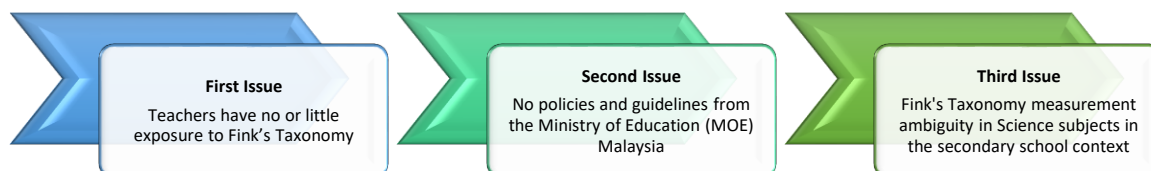


Figure 1: Three main issues in implementing Fink Taxonomy

Suggestions for Improvement of Issues

There are several strategies or suggestions for improvement in order to overcome the issues of Fink's Taxonomy implementation for Science subjects in the context of secondary schools. **One suggestion for improvement to the first issue (i.e., teachers have no or little exposure to Fink's Taxonomy)** is that teachers need to undergo Continuous Professionalism Development (CPD) activities related to Fink's Taxonomy. Generally, CPD is an effort towards developing professional PPPs who are skilled in terms of knowledge and skills, as well as the practice of professional values (Ministry of Education Malaysia, 2018). Among the activities that can provide exposure to Fink's Taxonomy to educators include courses, e-learning, and outreach programs at organizations inside and outside MOE. Science teachers in particular can follow formal courses with structured activities that include workshops, in-service training, seminars, conventions, colloquiums, forums, and round table conferences (Ministry of Education Malaysia, 2018). Through these courses, teachers will gain knowledge and exposure as well as improve their mastery of Fink's Taxonomy. The method of acquiring knowledge about Fink's Taxonomy through e-learning is also easier to understand and learn

(Kee et al., 2021), interactive, and able to attract individual interest (Ahmad Shakir & Adnan, 2020), improve one's understanding, and save time (Safuan et al., 2021).

Another suggestion for improvement to the second issue (i.e., no policies and guidelines from the Ministry of Education (MOE) Malaysia) is that MOE needs to come up with new guidelines for the implementation of Fink's Taxonomy in student learning. In this regard, MOE needs to take note as well as make evaluations and judgments about the implementation of Fink's Taxonomy in the education system. In addition, previous studies on Fink's Taxonomy can also be used as a reference and guide for applying and introducing this taxonomy to educators at all levels of education. Therefore, the ministry can provide policies and guidelines for the application of Fink's Taxonomy in the education system in Malaysia so that Fink's Taxonomy can be implemented at the school level. Besides, school administrators should also be responsible for integrating changes in schools and using leadership styles in motivating teachers (Fei & Han, 2017). As a result, teacher motivation can be increased, and this further encourages teachers to implement Fink's Taxonomy in teaching.

Finally, the last suggestion for improvement to the third issue (i.e., Fink's Taxonomy measurement ambiguity in Science subjects in the secondary school context) involves producing a measurement of teacher performance in implementing Fink's Taxonomy as well as student performance in Fink's Taxonomy through a clearer assessment rubric. Accordingly, some criteria and descriptors for each level of Fink's Taxonomy in Science subjects must be fully explained for the use of both teachers and students. In the context of secondary schools, the ambiguity of this measurement can cause performance evaluation to be less accurate and lose direction in the assessment. Science is indeed one of the complex subjects; therefore, many criteria and descriptors must be studied in order to choose the more dominant ones as opposed to the less dominant ones. Since most teachers tend to apply only Bloom's Taxonomy through the existing practice, Bloom's measurement is consequently produced more than Fink's. Hence, this suggestion must be implemented at every level, especially in secondary schools. Besides, Science teachers and pedagogy expert teachers can also be invited to share their thoughts on this aspect of measurement so that it can be more systematic and solid.

FT's Challenges to Science Teachers: Getting Better or Getting Worse?

In the author's view, the problem of Science teachers' competence in Fink's Taxonomy will continue since recent studies have actively highlighted the issues related to Fink's Taxonomy (Su, 2022; DeLuca et al., 2021). This is because teachers are the key driver in determining the direction and quality of education. In this regard, teachers in the 21st century must have high competence in educating the current generation (Rosli et al., 2022). Competence generally refers to the ability to do something based on mastery of knowledge, attitudes, and skills (Notanubun, 2019). Therefore, the competence of a teacher depends on their level of mastery of knowledge, skills, attitudes, skills, and values in order to produce learning quality at the maximum level. Based on the past studies discussed previously, Fink's Taxonomy can serve as an alternative to Bloom's Taxonomy in overcoming its weaknesses, which have increasingly begun to receive criticism from most academics. In another 10 years, the 21st-century learning system is expected to place more emphasis on metacognitive and affective aspects in the teaching and learning process that can be measured using Fink's Taxonomy.

In addition to the addressed issues, other challenges may also exist such as the willingness of teachers to implement the use of Fink's Taxonomy in teaching. Evidently, teachers are not prepared to implement Fink's Taxonomy because they lack exposure to information related to Fink's Taxonomy. In addition, teachers are also yet to have full readiness for the use of Fink's Taxonomy because they have yet to master the elements of Fink's Taxonomy measurement. Therefore, teachers should take their own initiative by reading and referring to the guidelines provided in the literature on Fink's Taxonomy. In addition, teachers should also know the necessary techniques in order to highlight students' strengths so that the teachers can plan their learning objectives based on Fink's Taxonomy. Essentially, a teacher's competence is evident when they succeed in producing significant learning among students.

In this era of globalization, all parties must take responsibility to address the issue of teacher competence in the implementation of Fink's Taxonomy for Science subjects in the secondary school context. In this regard, the Malaysian Ministry of Education (MOE), State Education Department (SED), District Education Office (DOE), schools, local communities, and parents must play their respective roles. In addition, necessary courses, workshops, and in-service training (LADAP) related to Fink's Taxonomy should also be provided continuously to teachers to ensure that their knowledge and skills of Fink's Taxonomy are constantly developed and strengthened. Furthermore, parents and society's views on education require a significant change so that they do not focus too much on achievement but more on the value of learning itself. Essentially, both parents and the local community must fully support the initiatives of the MOE, SED, DOE, and schools in cultivating the implementation of Fink's Taxonomy as a teaching measurement tool in order to produce significant learning among students.

In view of studies around the world, the prospect of Fink's Taxonomy is already wide, and the issues related to its implementation have spread to many groups. However, this is different from the situation in Malaysia where there are still many teachers who have no or little exposure to Fink's Taxonomy. Moreover, the ministry has yet to pay attention to this issue and there are also a few who have yet to conduct any study on Fink's Taxonomy.

If we are still lacking awareness and continue to be complacent even though criticisms about the weaknesses of Bloom's taxonomy, which has been practiced for a long time, have been highlighted in recent studies, then the transformation of the world-class education system will not be achieved. While we can assess whether to continue with the use of taxonomies that have been practiced for a long time, more and more weaknesses will appear due to changes in the education system. Nevertheless, we can try something new with a taxonomy that is not only more interactive and holistic but is also suitable for 21st-century learning, which will help improve the quality of the education system in our country.

Conclusion

This concept paper highlights issues such as the absence or the lack of exposure among teachers to Fink's Taxonomy, the absence of policies or guidelines from the Malaysian Ministry of Education (MOE), and the ambiguity of the measurement of Fink's Taxonomy in Science in the context of secondary schools. Besides, this concept paper also elaborates on the suggestions for improvements to the addressed issues. Moreover, the current Fink's Taxonomy concept paper provides implications for improving teacher competence with the implementation of Fink's Taxonomy in Science teaching. Since the improvement of teacher

competence can produce significant student learning, further research can be done by the Malaysian Ministry of Education (MOE) through the provision of policies or guidelines for the implementation of Fink's Taxonomy, in addition to organizing courses, workshops, and continuous training to empower Fink's Taxonomy among teachers. In addition, it is also suggested that researchers start conducting studies related to Fink's Taxonomy in Malaysia.

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References

- Tar, A. D. J., & Mahmud, M. (2021). Minat, tingkah laku disruptif dan gaya pembelajaran murid bermasalah pembelajaran di sekolah rendah. *Jurnal Dunia Pendidikan*, 3(4), 49-64. <https://doi.org/10.55057/jdspd.2021.3.4.5>
- Abdul Aziz, M. I., Mokhtar, M. M., Usman, M. M. M., & Aziz, M. A. S. (2022). Penguasaan Kemahiran lisan bakal guru Bahasa Melayu: Tinjauan terhadap tahap pengetahuan, kemahiran dan masalah pembelajaran dalam talian semasa pandemik. *Jurnal Dunia Pendidikan*, 4(2), 103-114. <https://doi.org/10.55057/jdspd.2022.4.2.10>
- Abdul Jobar, N., Sandy, S., Rusli, M. N. F., & Adam, M. N. F. (2021). Tinjauan pengetahuan, faktor dan kesan pelaksanaan Set Induksi dalam kalangan mahasiswa terhadap pengajaran dan pembelajaran Bahasa Melayu. *Asian Pendidikan*, 2(1), 9-18
- Ahmad, N. L., & Azman, N. A. H. (2020). Tahap amalan pengajaran berkesan guru Prinsip Perakaunan berasaskan Model Slavin. *Jurnal Pendidikan Malaysia*, 45(1), 53-62
- Shakir, A. N. S. B., & Adnan, N. H. B. (2020). Kebolegunaan Massive Open Online Course (MOOC) Sebagai E-Pembelajaran dalam Pengajaran Pengaturcaraan di Sekolah Menengah. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 5(6), 33-41. <https://doi.org/10.47405/mjssh.v5i6.429>
- Ahmad, Z., Abdullah, S., & Ahmad, N. (2020). Penggunaan Peta Konsep bagi menggalakkan Pembelajaran Bermakna. e Proceeding 10th National Conference in Education Technical & Vocational Education, hlm. 1-7
- Apul, D. S., & Philpott, S. M. (2011). Use of Outdoor Living Spaces and Fink's Taxonomy of Significant Learning in Sustainability Engineering Education. *Journal of Professional Issues in Engineering Education and Practice*, 137(2), 69-77
- Hisham, B. N. F. A & Kutty, F. M. (2021). Hubungan antara tahap penglibatan Guru Novis di negeri Melaka dalam pembelajaran tidak formal melalui media sosial dengan Pengurusan Bilik Darjah dan Pengurusan Emosi. *Malaysian Journal of Social Science and Humanities (MJSSH)*, 6(7), 246-257

- Barnes, M. E., & Caprino, K. (2016). Analyzing service-learning reflections through Fink's Taxonomy. *Teaching in Higher Education*, 21(5), 557–575. <https://doi.org/10.1080/13562517.2016.1160221>
- Barton, G. M., Baguley, M., Kerby, M., & MacDonald, A. (2020). Investigating the assessment practices within an Initial Teacher Education program in an Australian university: Staff perceptions and practices. *Australian Journal of Teacher Education*, 45(3), 34-4 <http://dx.doi.org/10.14221/ajte.2020v45n3.3>
- Berger, R. (2018). Here's What's Wrong with Bloom's Taxonomy: A Deeper Learning Perspective. Retrieved from <https://www.edweek.org/education/opinion-heres-whats-wrong-with-blooms-taxonomy-a-deeper-learning-perspective/2018/03>
- Billiot, T., & Forbes, L. P. (2020). Enhancing student empathy through the taxonomy of significant learning. *Journal of International Education in Business*, 14(1), 130–143. <https://doi.org/10.1108/JIEB-04-2020-0033>
- Branzetti, J., Gisondi, M. A., Hopson, L. R., & Regan, L. (2019). Aiming beyond competent: The Application of the Taxonomy of Significant Learning to Medical Education. *Teaching and Learning in Medicine*, 31(4), 466-478. <https://doi.org/10.1080/10401334.2018.1561368>
- Coco, C. H. (2012). The value of significant learning strategies in undergraduate education. *Journal of Learning in Higher Education*, 8(1), 1-5
- DeLuca, C., Searle, M., Carbone, K., Ge, J., & McEwan, D. L. (2021). Toward a Pedagogy for Slow and Significant Learning about assessment in teacher education. *Teaching and Teacher Education*, 1-12. <https://doi.org/10.1016/j.tate.2021.103316>
- Faisal, M. (2020). Bloom's Vs. Fink's Taxonomy: Students' Achievement in Science Proficiency at Primary Level in Pakistan. In *International Journal of Advanced Research in Education and Society*, 2(1), 32-41
- Fei, E. L. E., & Han, C. G. K. (2017). Hubungan Kepimpinan Pengetua dengan Motivasi Guru. *International Journal of Education, Psychology and Counseling*, 2(5), 145-159
- Fink, L. D. (2003). *A Self-Directed Guide to Designing Courses for Significant Learning*. Retrieved from https://www.acousticlab.org/dots_sample/general/Fink2003SelfDirected.pdf
- Hussin, R. (2013). Pendekatan teori pembelajaran Kognitivisme dalam Pendidikan Seni Visual. *Jurnal Seni dan Pendidikan Seni*, 1, 59-66
- Jamaludin, N. I. S., Mohamad Deris, H. M., Yaafar, N. S., & Zain, F. M. (2022). Gamifikasi dalam PdPR: Integrasi teknologi menggunakan Quizziz. *Practitioner Research*, 4, 151-171
- Keating, D., McWilliams, S., Hynes, C., Clarke, M., & Strawbridge, J. (2019). Pharmacy students' reflections on an Experiential Learning Visit to a Psychiatric Hospital. *American Journal of Pharmaceutical Education*, 83(5), 882-891
- Kementerian Pendidikan Malaysia. (2018). Garis Panduan Pelaksanaan Mata Kredit Pembangunan Profesionalisme Berterusan (MyPBB) Pegawai Perkhidmatan Pendidikan (PPP), Kementerian Pendidikan Malaysia (KPM). Retrived from <https://www.moe.gov.my/pekeliling/2136-surat-siaran-kementerian-pendidikan-malaysia-bilangan-12-tahun-2018-garis-panduan-pelaksanaan-mata-kredit-pembangunan-profesionalisme-berterusan-myppb-pegawai-perkhidmatan-pendidikan-ppp-kementerian-pendidikan-malaysia-kpm/file>
- Krueger, K. P., Russell, M. A., & Bischoff, J. (2011). A health policy course based on Fink's Taxonomy of Significant Learning. *American Journal Pharmaceutical Education*, 75(1), 1-7

- Kusumawardani, S. S., Nugroho, L. E., Susanto, A., Kumara, A., Wasisto, H. S., & Cortes, U. (2014). Reducing student's learning duration on Engineering Final Project by implementing Fink's Taxonomy on e-learning. *Journal of Theoretical and Applied Information Technology*, 68(3), 699-704
- Lemov, D. (2017). Bloom's Taxonomy – That Pyramid is a Problem. Retrived from <https://teachlikeachampion.org/blog/blooms-taxonomy-pyramid-problem/>
- Levine, L. E., Fallahi, C. R., Nicoll-Senft, J. M., Tessier, J. T., Watson, C. L., & Wood, R. M. (2010). Creating Significant Learning experiences across Disciplines. *College Teaching*, 56(4), 247-254
- Li, J. H. J., Maat, S. M. (2022). Kemahiran Menjana Masalah Matematik Berayat Berdasarkan Taksonomi Bloom Semakan dalam kalangan Guru Matematik. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 7(3), e001380. <https://doi.org/10.47405/mjssh.v7i3.1380>
- Mandur, K., Nendi, F., Men, F. E., & Jelatu, S. (2021). Respon mahasiswa terhadap penyelesaian soal koneksi Matematis melalui Taksonomi Fink. *Jurnal Pendidikan Matematika*, 7(1), 41-51
- Safuan, M. S. S., Abd Rahman, I., & Aziz, A. (2021). Peranan Komunikasi dalam E-Pembelajaran: Impak Terhadap Prestasi Pembelajaran Mahasiswa Pasca Covid-19. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 6(11), 198–210. <https://doi.org/10.47405/mjssh.v6i11.1154>
- Mukdaprasert, K., & Chalauisaeng, B. (2021). Cultivating Wisdom, Morality and Happiness in Thai Secondary School Students by Implementing the Novel Transforming Learning Taxonomy 100. In *Journal of Mekong Societies*, 17(2), 99-120
- Notanubun, Z. (2019). Pengembangan kompetensi profesionalisme guru di era digital (Abad 21). *Jurnal Bimbingan dan Konseling Terapan*, 3(1), 54-64
- Odom, S. F., McKee, V., & Dunn, A. L. (2017). Measuring significant learning through a Personal Leadership Transformation Assignment in an Undergraduate Leadership course. *Journal of Leadership Education*, 67-81
- Pampel, R. J. (2018). What makes a curriculum significant? Tracing the Taxonomy of significant learning in Jesuit Honors Programs. *Journal of the National Collegiate Honors Council – Online Archive*, 19(1), 41-62
- Partido, B. B., Chartier, E., & Jewell, J. (2020). Evaluation of an e-book assignment using Fink's Taxonomy of Significant Learning among undergraduate dental hygiene students. *Journal of Dental Education*, 84(10), 1074–1083. <https://doi.org/10.1002/jdd.12247>
- Rosli, M. F., Ahmad, A. R., & M. Nasir, M. K. (2022). Hubungan antara Kompetensi Guru dengan Motivasi murid untuk belajar dalam Norma Baharu. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 7(3), 1-15. <https://doi.org/10.47405/mjssh.v7i3.1373>
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10
- Su, C. (2022). Incorporating Fink's Integrated Model to developing writing courses in college. *International Journal of English Language Teaching*, 10(6), 8-18
- Uribe Cantalejo, J. C., & Pardo, M.I. (2020). Fink's integrated course design and taxonomy: The impact of their use in a "Basics of Dental Anatomy" course. *Journal of Dental Education*, 84(9), 964–973. <https://doi.org/10.1002/jdd.12183>
- Voon, S. H., & Amran, M. S. (2021). Pengaplikasian teori pmbelajaran Konstruktivisme dalam pembelajaran Matematik. *Sains Insani*. 6(2), 73-82

Zainal, K. (2008). Memahami tingkah laku remaja bermasalah dari perspektif teori tingkah laku, humanistik, psikoanalitik & tret personaliti. *MALIM: Jurnal Pengajian Umum Asia Tenggara*, 9, 43-56