# MEANINGFUL GENERAL SCIENCE LEARNING EXPERIENCE AND ITS RELEVANCY TO THE REAL-WORLD IN UPPER SECONDARY LEVEL CURRICULUM

**Mohd Razimi Husin[1], Adibah Abu Bakar[2], Hishamuddin Ahmad[3], Muhammad Bazlan Mustafa[4], Ismail Yusuf Panessai[5], Ramlan[6]**

[1]Universiti Pendidikan Sultan Idris, Tanjong Malim, 35900 Perak, Malaysia

[2,3,4,5]Universiti Pendidikan Sultan Idris, Tanjong Malim, 35900 Perak, Malaysia

[6]Universitas Pasundan, Indonesia, Kota Bandung, Jawa Barat 40264, Indonesia. Email: razimi@fpm.upsi.edu.my

## ABSTRACT

This paper presents the meaningful of general science learning content that related to daily lives and its preliminary relationships for career choice. The scope of the study involves former upper secondary level students who take general science in the Malaysian Certificate of Education. This study involves the content of form 4 and 5 general science subjects. This study uses a qualitative approach which involves interviews that are analyse using Nvivo software. A qualitative approach uses phenomenological design to recall former students' experiences of meaningful science learning content. Twelve experience workers were selected through purposeful sampling who had enrolled for general science in Malaysian Certificate of Education level. The results show that there are respondents who obtained very good examination results were less able to take advantage of the subject because most of higher learning institutions tend to choose students who have biology or more relevant subjects in certain courses. There is a lot of learning content that is beneficial for them to use upon graduation and related to daily life and jobs. Content of general science subjects that are meaningful and important in daily life are elements and material, and emergency help for form 4 syllabus and nutrition and food technology for form 5 syllabus. This study produces a framework table related to content, learning strategy and work-related for the use of educators in utilizing the subject in designing teaching methods, fostering students' career aspirations and as early ideas in formulating policies related to the curriculum.

**Key words** Meaningful learning, general science, daily lives and career choice.

## INTRODUCTION

The Malaysia Education Ministry's (MEM) objective in the curriculum standard is to expect the knowledge acquired by students to help them in their daily lives and career choices. Effective learning experiences and meaningful content received while in the school environment are essential to students' life aspirations (Husin et al., 2020a). The willingness to implement something beneficial and implement appropriate improvements will be able to improve the quality of knowledge imparted that benefits the organization, society and the country. A person's formal knowledge and skills are acquired while in school. Most students in Malaysia have been in school for at least 11 years. Meaningful learning starts as early as children's education as develop a comprehensive framework on the quality of Malaysian early childhood care and education (Ahmad et al., 2021). Similarly, the learning of students at the next level requires attention from various aspects, including aspects of meaningful learning and coincidence with the real world.

The content and experience of science learning is inadequate if without taking into account the learning needs for daily use and future use. Similarly, it is not enough for students to study solely to pass exams, while 21st century education emphasizes learning for life. The general trend in educational development is according to the interaction between the unique aspects of the students and the context of his family, community and environment. As a result, children have their own clear needs and principles and reinforce self-aspirations to enable optimal growth in competence, confidence and motivation. The kind of learning are taking into account of having a chosen career for future profession, having a sense of care, aware of the characteristics of their choice of career and confident in their ability to perform their chosen career. As well to indigenous community in Malaysia that their learning have to take into account of their need as the elements that need to be incorporated in the syllabus, namely herbs and medicine, tools for hunting and forestry (Wahab et al., 2020). Another thing is that learning should be accommodated to the learning styles of students (Husin et al., 2018). The learning

styles mostly have a relationship with the context of their lives.

However, there is no specific research for particular subjects for it to be use as a guide. The new curriculum implemented addresses the content that is required to be delivered to the students based on their core and stream of the students. One of the subjects that compulsory for humanistic stream is Science.

Appropriate learning experiences and content can help students not only achieve high performance in general science subjects, but also beneficial in daily life and forming preliminary career aspirations. This requires a strategic framework to support the science and future careers of students (Jufrida *et al.,* 2019). Hands-on methods is an effective science learning experiences. Memorization is a learning that does not really learn the material. Students memorize it for one purpose and may not be skilled at using or managing it. Maintaining information in the long term is not something that can be underestimated. Teachers struggle to teach, but it is very unfortunate if what is taught does not permeate the mind and is forgotten just like that.

Hands-on learning has proven to be more effective in helping students understand what is being taught. There is no shortage of studies showing hands-on learning has a significant impact. Hands-on learning is more meaningful if students are given the opportunity to produce an innovative product such as building a water purification device rather than just listening to a lecture on water quality. In addition to methods of hands-on activity simulation and games are methods that enhance students' understanding of Science subjects (Chetty *et al.,* 2019). Collaborative and problem-solving activities also help students understand the content of Science subjects. Collaborative problem solving involves two different constructs, the first is collaboration and the second is problem solving.

Group assignments are important for solving problems that are too complex and relatively difficult for an individual to solve on their own. In a group it necessarily contains individuals with different information, expertise and experience who are able to bring together to solve a particular problem. Collaborative problem solving requires expertise from various fields to share resources and strategies to achieve goals through some type of communication process.. Other studies have found teamwork, responsibility, and collaborative learning appears to be the most important factors for effective learning. Cooperative learning is a pedagogical method in which students work together to maximize their own learning. Cooperative learning has five requirements element that are positive interdependence, promotive interactions, individual accountability and personal responsibility, social skills, and group processing. An educator needs to be a skilled learning designer in managing classes and processing learning. One of the methods that students are very interested in is games. Teachers need to be prepared to design compelling educational scenarios. There is a lot of research involved in studying the commercial design of student engagement in play. Educators may be able to facilitate engaging educational design, simplified through quantitative engagement metrics (SCEQ) and game design principles (GameFlow) (Williams, 2019).

The learning content and experience are inadequate if they are only able to apply what they have learned while disregarding its needs in daily life or future use. The benefits of learning are innumerable. But learning requires a high level of commitment. Learning will be beneficial when it is adapted to the individual who is learning and to understand more about the world around the individual. Learning requires high commitment and a positive individual with knowledge and skills will promise oneself to continue to learn and continue to seek more knowledge. If the main goal of students in learning is to become more knowledgeable about themselves and become more knowledgeable about the world around them, then at the same time they will become more knowledgeable about the world that is within them. Students will be able to adapt to the environment and be able to become a perfect human capital through the knowledge and skills available. Their minds will be richer, old memories will be more meaningful, and new thoughts will be more amazing, all because they have more things to work on. Having a larger vocabulary and having more knowledge gives rise to more ideas. Learning produces learning, knowledge produces knowledge and skills produce more skills. Learning is everything that students are now and everything that students will be in the future. Learning gives students better thinking, better ideas, better solutions, better understanding, better skills and better awareness. The same goes for the learning for the sake of passing an examination. The 21$^{st}$ century education emphasizes on learning for life (Shola *et al.,* 2019). Therefore, education bodies need to study this issue in more depth. Not only technical and vacation stream students are given attention in daily life and career aspects, but the experience and content of learning in mainstream schools also need to look at the learning aspect for life.

There are various opportunities for further studies offered to students after sit for MCE. Yet many questions fill their minds in choosing the appropriate field. This study not emphasizes on the selection of fields, but emphasizes on the use of the content of MCE's general science in daily life and its preliminary relationships to career choice from the content and strategy of teaching.

This paper presents the meaningful MCE's general science content from former upper secondary level students that related to their daily lives after school and identify its preliminary relationships to career choice from the content and strategy of teaching. This study uses qualitative method in examining the effectiveness approach of the learning that in the subject and the related content to works.

## RESEARCH METHOD

This study uses a qualitative approach involving interviews analysed using NVivo software. This study is a cross-sectional study involving former students who have completed school at the upper secondary level over 5 years and have had their own careers. Participants of the study were selected by purposive sampling to obtain clear information about research questions one and two. Researchers conducted interviews with 12 former secondary school students who took general science in MCE.

The qualitative approach in this study uses phenomenological design through interview method to

describe students' meaningful experiences in upper secondary Science learning. To measure meaningful science learning content that related to their daily lives after school and Identify science relevant for students' career choice, the former upper secondary level students were asked to answer open-ended questions.

The interviews to be conducted are semi-structured whereby the questions draft are provided as guidelines and are conducted individually. In collecting and analysing data, researchers have coded, screened, linked categories and concepts, constructed theories and created themes based on the transcripts of the participants.

Examples of the phenomena that are examined are the learning activities, titles and knowledge of form four and five that have a lot to do with their daily life and the real factors of career selection for MCE students.

**RESULTS**

Based on interviews, there were several meaningful of general science learning content from former upper secondary level students that related to their daily lives after school. Meanwhile, the level of relevance of general science students choose their career still needs further discussion.

**Table 1:** *Science Learning Contents That Affect Their Daily Lives and Career Aspirations*

| Contents | Participants | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 |
| Topic Form 4 | | | | | | | | | / | / | / | / |
| Elements and Materials | // | // | // | // | // | // | // | // | // | // | // | // |
| Emergency help | / | / | / | / | / | / | / | / | / | / | / | / |
| Techniques for Measuring Body Health Parameters | // | // | // | // | // | // | // | // | // | // | // | // |
| Body coordination | // | // | // | // | // | // | // | // | // | // | // | // |
| Force and movement | // | // | // | // | // | // | // | // | // | // | // | // |
| Genetics | / | / | / | / | / | / | / | / | / | / | / | / |
| Support, Movement and Growth | // | / | // | // | // | // | // | // | // | // | // | // |
| Light and Optics | // | // | // | // | // | // | // | // | // | // | // | // |
| Topic Form 5 | / | / | / | / | / | | | | | | | |
| Nutrition and Food Technology | / / | / / | / / | / / | / / | / | / | / | / | / | / | / |
| Force and Pressure | | | | | / | | | | | | | |

**Table 2:** *Content, learning strategy and work-related of upper secondary level general science subjects*

| Contents and Specifications | Learning Strategy | Work-related |
|---|---|---|
| Elements and Materials.<br>Genetics.<br>Support, Movement and Growth.<br>Light and Optics.<br>Fluid. | Laboratory (Inquiry-Based Science Education- Students learn through doing, through asking questions, carrying out experiments, and considering alternative hypotheses.)<br><br>Real Learning aid (Contextualized teaching and learning- Connecting Science Class to the Real-World - hands-on, concrete learning that will be a reinforcement of relevancy | General Teachers |
| Emergency help<br>Techniques for Measuring Body Health Parameters.<br>Body coordination.<br>Force and movement.<br>Force and Pressure.<br>Organs.<br>Screw<br>Landslide | | Freight Loader<br>Salesperson<br>Workshop Man<br>Fire Bridget |
| Agriculture.<br>Nutrition and Food Technology.<br>Bio-technology.<br>Crop production and agriculture. | | Agriculture |

**The Meaningful of General Science Learning Content That Related to Their Daily Lives After School**

There are a number of daily lives and work-related to meaningful of general science learning content that is mechanic, firefighters and rescuers, modern farmers,

teachers and salesperson. Findings show that there were several topics of general science learning contents that affect former students daily lives and career aspirations as shown in Table 1.

**Identify Preliminary General Science Relevancy for Students Career Choice of Former MCE Students**

From the samples, there are participants had enrolled in university programmed according to their tendency and based on the achievement in another subjects. However, two students were previously had tendency to choose programmed with science subject due to their ability. Their application was rejected due to the general science subject was not the particular subject to qualify in the agriculture and bio-technology programmed.

The science stream students enrolled for Biology. General science subject and biology form four and form five is not too different in major content. It is suggested that the supporting subject like general science subjects can be replaced by biology and no need to take physic and chemistry. The findings confirmed that choosing the rights subject with good achievement are among the factors that influencing the opportunity of the younger generations to enrol certain field of study for their undergraduates.

There are a number of work-related to the humanity stream students, but not specifically related to general science subject as the subject just for support in getting distinguished cumulative result. The general science subject did not much support in pursue higher education among excellent achievement to enrol in so-called science stream programmed such as agriculture and bio-technology. So, the learning content chosen in science core subject should be revised and merged with biology. Very few participants had very little idea and most of them no idea of their future job during the past form 4 and form 5. But from the interview, researchers found that there were preliminary idea of career aspiration as shown in Table 2.

**DISCUSSION**

Based on past studies the effective science learning experience is through hands-on method (Peterson & Scott, 2018). Collaboration and problem solving activities also help students in understanding the content of science subjects (Rekai Zenda, 2017). Teachers should have an ideal way to teach students how to use self-monitoring strategies such as a study that focuses on the importance of monitoring and self-efficacy strategies that help students practice them (Ueki, 2013). Similarly in a previous study, teachers can implement the method of the inductive-directed delivery approach which shows significance in giving a positive effect on students involvement or associated with classroom activities (Husin et al., 2020b).

Teaching in the classroom should relate to daily life or the outside actual situation including at workplace. This study found that there are a number of daily lives and work-related to meaningful of general science learning content that is mechanic, firefighters and rescuers, modern farmers, teachers and salesperson. According to old study, there are many syllables that can be directly related to everyday life and work especially science that is nursing (Tsuda, 1974). The more studies, the more information about the relevance of the content to human daily life in particular. Teachers must adapt to the challenges facing different contexts in the classroom daily life. Learning planning needs to be reviewed at all times to produce meaningful learning. Action research should be considered if a solution is needed (Franco & Munford, 2020).

Although student achievement is fair in science core subject, the long-term impact is important so that the knowledge gained in school can be leveraged later. It will expect that education will become more meaningful and national education institutions will excel in such a way of learning. The fact in science should not be a tentative but inspire student to think of career. It is understood that all science information is tentative and can be evolving. It is the role of teachers to keep students' experiential to develop meaningful contextual information. Teachers and researchers should not be shy about saying or doing so, both to those in schools and to those in charge of schools (Editors, 2017). Teachers also need to move from the old-fashioned approach to pressures appropriate to 21st century education. Previous study was shown that top management leadership that had career aspiration as early as in school age, but the ex-students with lower achievement and did not have future aspiration was discovered to have the uncertainty in their career (Hee et al., 2020). In a nut shell, what is valued in science subject is what is considered relevant in the student's context that influences their lives (Franco & Munford, 2020). Suggestion to next researchers is to study and collect the data from excellent students and its work-related contents of particular science subject in MCE.

This paper presents science-related aspirations of career based on learning content in Upper Secondary Level. Core Science subject teachers should use the most appropriate approach to students. Such an approach is like using existing-real learning aids and doing practical in the laboratory especially for topics that are much related to the daily routine of students and future prospects to students. According to previous studies, teachers should have appropriate methods to teach students how to use self-monitoring strategies. However, the level of students studied required more guidance from teachers than self-monitoring. In science, there are many syllabuses that are directly related to occupations. However, students had no idea of the job related to learning during the past form 4 and form 5 (Husin et al., 2020b).

But on the other hand, the general science subject will not qualify students to venture into the field of nursing according to the qualifications of nurses in some universities.

It is suggested that the supporting subject like general science subjects can be replaced by biology. The findings confirmed that choosing the rights subject with good achievement are among the factors that influencing the opportunity of the younger generations to enrol certain field of study for their undergraduates.

This study is to provide a significant contribution to teachers in selecting learning activities and experiences that are appropriate to the learning content in teaching and learning to produce effective learning. Effective learning is learning that not only emphasizes short-term achievement, but also emphasizes long-term outcomes that is the use of knowledge in life and throughout life. This study also benefits teachers and students when the

learning that takes place takes into account the suitability of a content, learning experience and appreciate the use of knowledge learned.

In nut shell to make the science relevant, several things need to be taken into account in the teaching and learning of science such as students' dreams or aspirations, unique experiences and hobby or interests.

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