The Effect of 5E Inquiry Learning Model on the Science Achievement in the Learning of "Magnet" among Year 3 Students

by Eng Tek Ong

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ABSTRACT

This paper aims to gauge the effect of 5E Inquiry Learning Model as compared to the conventional method in enhancing the science achievement among Year 3 students using the learning context of "magnet". A quasi-experimental pretest-posttest control group design was employed with the participation of 40 students from two intact Year 3 classes in a primary school in Kuala Kangsar. The experimental group was taught using the 5E Inquiry Learning Model which consists of 5 phases, namely Engagement, Exploration, Explanation, Expansion, & Evaluation, while the control group was taught using the teacher-centred conventional method. The science achievement in the learning of "Magnet" was measured by means of a researcher-developed test consisting of 12 multiple-choice and 8 fill-in-the-blank items. The test has sufficient validity and KR-20 reliability. Analysis of the pretest data indicates that there was no statistical significant difference (t = 1.66, p > .05) in the pretest means between the experimental and control groups. Accordingly, an independent samples t-test was used to compare the student achievement in the posttest. The analysis of the posttest data indicates that the posttest mean in science achievement (16.05) among the group of students who had followed through the 5E Inquiry Learning Model is statistically significantly higher (t = 4.75, p < .001) than the corresponding mean (13.15) among the group of students in the control group. Therefore, it can be concluded that the 5E Inquiry Learning Model enhances the learning of science in terms of achievement among the primary students.

Keywords: Inquiry Learning, 5E, Primary Science, Magnet

Correspondence Address

E-mail: ong.engtek@fpm.upsi.edu.my

INTRODUCTION

The 60:40 policy -- instituted in 1967 and implemented in 1970, envisages that 60% of the Malaysian students will follow through the science stream, while the remainder 40% will uptake the arts and humanities subjects. The conceptualization and subsequent enactment of this 60:40 policy was due to the crucial needs of around 500,000 scientists and engineers by 2020 in Malaysia based on the projection of the National Council for Scientific Research and Development (Azian, 2015). However, the statistics as of 2014 indicate only about 45% secondary students are taking the science stream which, according to Azian (2015), includes the technical-based subjects. Table 1 summarizes the statistics from the enrolment of Malaysian students at the Form 5 level for Year 2018 by academic streams and gender (Educational Planning and Research Division, 2018). There is a total of 149,040 science-based students out of the overall 361,980 students, and this works out to be 41.17%.

Table 1. Year 2018 Enrolment of Malaysian Students at Form 5 Level by Academic Streams and Gender

	Year 2018		
Form 5 (Upper Secondary)	**Male**	**Female**	**Total**
Arts	105,149	101,893	207,042
Science	33,754	50,032	83,786
Religious	2,184	3,714	5,898
Vocational/Technology	20,054	26,683	46,737
Vocational	9,958	6,211	16,169
Technical	1,201	1,147	2,348
Total	172,300	189,680	361,980

The 41.17% of science-based Form 5 students recorded falls short of the aspired 60%. The gloomy enrolment in science stream is further compounded by the unfavourable achievement of Malaysia in the *Trends in Mathematics and Science Study* (TIMSS) 2011 which indicates a marked decline in science from the 21st ranking in TIMSS 2007 to that of 32nd ranking in TIMSS 2011 among 63 participating countries (Martin et al., 2012). In the TIMSS 2015, the ranking of Malaysia did improve, climbing to the 24th place in science with the attainment of 471 mean score which fell short of the 500 Centre point in TIMSS Scale (Martin et al., 2016).

Hence, it is timely for Malaysia to explicitly state in the Malaysia Education Blueprint 2013-2025 (Ministry of Education, 2012) that in order to achieve a quality education, Malaysia desires to attain the "top third of the countries in international assessments such as … TIMSS in [the next] 15 years" (Ministry of Education, 2012, Executive Summary, p.9). In order to achieve its desire to be at the world top third, the Malaysian Ministry of Education has enumerated a number of concerns which may have contributed to the unfavourable achievement in TIMSS. Among these concerns is the erratic quality of science teaching and learning in schools (Azian, 2015). Additionally, the science activities conducted in the classrooms were boring, non-captivating and uninteresting, mainly because there was "too much talking by their teachers" (Rohandi, 2017, p. 22), signifying a teacher-centred classroom with a prevalence of teacher talk. This echoes the previous findings by Ong and Ruthven (2010) who characterized the prevailing science teaching and learning in the Malaysian classrooms and found that it was mainly teacher-centred with didactic teaching and that note-copying syndrome was prevalent.

The analysis of the Malaysian science curriculum guides and syllabuses across grades and levels (Curriculum Development Division [CDD], 2015, 2016, 2017) indicates that inquiry learning has been strongly advocated. For example, in the syllabus for Year 3 (CDD, 2017), a special theme on "Inquiry Learning" (pp. 37-52) has been specifically advocated. The emphasis on inquiry learning aims to cultivate the higher order thinking skills (HOTS) among the children and HOTS are among the 21st Century skills as succinctly stated in the preface of the syllabuses, for example, "In ensuring the success of the Primary School Standard Curriculum, the teaching and learning of teachers should place emphases on Higher Order Thinking Skills by focusing on the Inquiry-based Learning approach … so that students could master the skills needed for the 21st century" (CDD, 2017, p. ix). Such an emphasis on inquiry learning is in step with the direction of science education in other countries such as France, Denmark, the United Kingdom, and the European Union. For examples, "La main à la pâte" (LAMAP) program in France, *Assess Inquiry in Science, Technology and Mathematics Education* (ASSIST-ME) in Denmark, *Strategies for Assessment of Inquiry Learning in Science* (SAILS) in the UK, and the Inquiry in Science Education that subsumes under the Fibonacci Project (2010-2013) in the European Union (Harlen, 2012).

Problem Statement and Research Objective

There are many science pedagogical approaches to enacting an inquiry-based teaching in the classrooms. Among these pedagogical approaches are Eggen and Kauchak's (2012) General Inquiry Model, Suchman's (1966) Inquiry Model, Llewellyn (2013)'s 6-Stage Inquiry Cycle, and Bybee and Landes's (1990) 5E Instructional Model which is alternatively termed as 5E Inquiry Learning Model (Ong et al., 2018) as it promotes inquiry in the learning of science (Duran & Duran, 2004). The 5E Inquiry Learning Model, consisting of engagement, exploration, explanation, elaboration, and evaluation phases, was further expanded by Eisenkraft (2003) to that of 7E Inquiry Learning Model with the addition of the "elicitation" phase at the beginning, and the "extension" phase at the end of the 5E Inquiry Learning Model.

The notion of inquiry learning, according to Ong et al. (2018), is still nebulous, ill-defined, and vague among the science teachers. Nebulous because the term "inquiry" is subjected to different interpretations and practices, causing widespread confusion among the science teachers and the science teacher educators (Barrow, 2006). Therefore, it is unsurprising when Settlage (2003) reckons that the notion of "inquiry" is "… one of the most confounding terms within science education" (p. 34). Equally, Gautreau and Binns (2012) also noted the confusion among many science teachers as to "what inquiry is, how to implement it, and how well it works, [and it was concluded that] it's little wonder that inquiry has not become more common in today's classrooms" (p. 169), signifying much less-than-expected enactment of inquiry-based teaching in the classrooms among the science teachers. Meanwhile, there is another fraction of teachers who are in their comfort zones of using one-way, didactic, transmission approach to the teaching of science (Kazempour & Amirshokoohi, 2014; Lee, 1992; Zainal,

1988) despite the directive from the Ministry of Education to employ inquiry teaching and learning, specifically the 5E Inquiry Learning Model.

In view of these problematic situations, there is a need to provide teachers with the research-based classroom-validated examples of inquiry science teaching, particularly the 5E Inquiry Learning Model that has been advocated by the Malaysian Ministry of Education. This aims to familiarise the science teachers as to "what inquiry [learning] is, how to implement it, and how well it works" (Gautreau & Binns, 2012, p.169). Given that magnetism, according to Van Hook and Huziak-Clark (2007), is reckoned as an important topic in the study of natural science, and hence a rudimentary concept for pre-primary and primary school students (National Research Council [NRC], 1996), and that students almost interact daily with magnetic matters such as refrigerator magnets, magnetic blocks or magnetic toys, the topic on magnet is thus chosen as the context of the study. Year 3 students are chosen for the study on the basis that the topic on magnet is covered in the Year 3 science syllabus (Curriculum Development Division, 2012).

Accordingly, the objective of this study is to seek answers to the research question: What is the effect of the 5E Inquiry Learning Model on the achievement in the learning of "Magnet" among Year 3 Malaysian students? Corollary, this study also tests the null hypothesis: There is no significant difference in the achievement in the learning of "Magnet" among Year 3 Malaysian students who have followed through the 5E Inquiry Learning Model and the achievement in the learning of "Magnet" among the Year 3 Malaysian students who have followed through the teacher-centred conventional teaching.

5E Inquiry Learning Model

The Soviet Union successful launched the world's first artificial satellite, Sputnik I on October 4, 1957, and this has ushered in new scientific, technological, political and military developments, particularly between the US and Russia. Lagging behind the Russians in space race has awaken US to the extent that they started to re-look at the quality of their science curriculum and of the science teaching in schools. Such a questioning contributed to a great shift in the goals of American Science Education, with mushrooming of many projects and initiative, many of which are financially supported by the National Science Foundation (NSF).

Gagne (1963), in his seminal paper, proposed the over-arching purpose of science education that encompasses the sub-goals of students acquiring the attitudes, the methods, and the understanding of inquiry. He contended that students should be able to conduct inquiry just like the scientists, and that the ability to be like the scientists is reliant on the attainment of the perceptive knowledge and scientific skills that include fundamental capabilities such as the skills of observing, classifying, inferring, hypothesising, and conducting science investigations. He asserted that "an individual needs to know how to observe, to classify … before he can understand science" (Gagne, 1963, p.152).

Equally, Schwab (1966) believed that students should understand the nature of science, comprehending the tentative nature of science whereby the currently acceptable science concepts may undergo revision in light of new information, evidence or discoveries. Additionally, Schwab (1960) had also advocated that science should be taught in an inquiry manner. Schwab (1960) categorised inquiry into stable inquiry and fluid inquiry. In stable inquiry, the established principles determine the experiments, while in fluid inquiry, the established principles are reckoned as problems themselves. Accordingly, students need to be taught to construct bodies of evidence in relation to the current theories and principles (i.e., stable inquiry) and to construct new theories and principles (i.e., fluid inquiry) through the judicious use of the laboratory work.

Hence, the prominent theme from the papers of Gagne (1963), Schwab (1960, 1966), and other reform documents such as the *National Science Education Standards* (National Research Council, 1996) and *Project 2061: Science for All Americans* (Rutherford & Ahlgren, 1989) is the inclusion of inquiry-based teaching methodologies. Therefore, the 5E Inquiry Learning Model (Bybee & Landes, 1990) will be discussed since it is the instructional method used in the study.

Based on Bransford et al.'s (2000) *How People Learn: Brain, Mind, Experience, and School* and Donovan and Bransford's (2005) *How Students Learn: Science in the Classroom*, Bybee et al. (2006) established that "the sustained use of an effective, research-based instructional model can help students learn fundamental concepts in science and other domains" (p. 1). The consistent use of classroom-based and research-validated effective instructional models is crucial as it harnesses the effects on students' learning. Accordingly, the 5E Inquiry Learning Model is advocated in this study (Bybee & Landes, 1990; Ong et al., 2018).

As acknowledged by Bybee et al. (2006), the 5E Inquiry Learning Model originates from the Three-Phase Learning Cycle propounded by Atkin and Karplus (1962). The three phases are exploration, invention, and discovery. The exploration phase is characterized by providing students with the initial experience of the phenomenon at hand, while the invention phase is characterized by introducing students to new terms that are related to the concepts at hand. Meanwhile, the discovery phase is characterized by students applying concepts and using terms in new or novel situations. These three phases were subsequently being renamed and referred to as *exploration*, *term introduction*, and *concept application* (Lawson, 1988; 1995), and *explore*, *explain*, and *expand* (Throwbridge & Bybee, 1990).

Basically, the 5E Inquiry Learning Model (Bybee & Landes, 1990) entails five phases: engagement, exploration, explanation, elaboration, and evaluation. There is a specific pedagogical function that underlies each of the five phases and together, these five phases constitute the inquiry learning process in the classroom. Nevertheless, the second, third, and fourth phases are generally similar to that of the three phases by Atkin and Karplus (1962). The pedagogical function for each phase in the 5E Inquiry Learning Model is summarized in Table 2. The enactment of 5E Inquiry Learning is illustrated using a Year 3 primary science content with the learning outcomes in that students are expected to (i) generalize the action of a magnet on multiple objects by carrying out an investigation; (ii) classify objects based on the action of a magnet on them; (iii) state that objects made of iron are magnetic objects; and (iv) design an object based on the usage of magnet.

In the first phase (i.e., engagement), a prediction worksheet which depicts a variety of objects is distributed and students are expected to predict whether or not each object is attracted by the magnet. Uncovering or eliciting students' existing ideas on objects which are attracted by a magnet is the main aim of the engagement phase. In the second phase (i.e., exploration), students are involved in hands-on science investigative activities within their respective cooperative learning groups to determine if their predictions are correct. They then discuss and record the observations. Providing the similar hands-on science investigative activities for students to test their earlier predictions is the main aim of the exploration phase so that their initial, pre-existing ideas/knowledge could be plausibly restructured. In the third phase (i.e., explanation), teacher uses students' common base hands-on experience to categorise the objects into two categories: objects that are attracted, and objects that are not attracted by a magnet. Teacher then introduces the concept of magnetic objects. In the fourth phase (i.e., elaboration), students are tasked to plan, design and create a train carriage which capitalizes on the use of magnets within their respective cooperative learning groups. Finally, in the fifth phase (i.e., evaluation), students are administered a short quiz to determine the extent to which they have achieved the learning outcomes.

Table 2. Phases and Their Corresponding Pedagogical Functions in 5E Inquiry Learning Model

Phase	Pedagogical Function
Engagement	The engagement phase aims to promote students' curiosity and to elicit students' prior knowledge, so that they are engaged in, and thinking about, the new concept by providing them with short activities. These activities assist in making connections between the previous and present experiences of learning, eliciting pre-instructional understanding, and organizing students' post-instructional understanding from the learning activities.
Exploration	The exploration phase provides students with similar or common activities /experiences so that conceptual change could be facilitated in which students' current or pre-instructional understanding and skills are meaningfully restructured. Students may conduct lab activities that help students to use pre-instructional understanding/views to explore questions, generate hypothesis, and conduct scientific investigation.
Explanation	The explanation phase focuses students' attention on a particular aspect of the activities carried out during the engagement and exploration phases. It also provides opportunities for students to demonstrate their restructured views or understanding, process skills, or behaviours. Besides, teachers may also directly introduce a concept or skill. Students explicate and demonstrate their conceptual understanding. A teacher's explanation or the explanation given in the textbooks or curriculum should guide students towards a better and meaningful understanding.
Elaboration	This phase is characterised by the applications and extension of the concepts learned and skills acquired by means of conducting new, novel or additional activities. The elaboration phase helps students to develop a thorough and meaningful understanding of the newly acquired concepts and skills.
Evaluation	The phase assesses students' understanding and acquired skills. It also provides teachers with the opportunity to evaluate the extent to which their students have mastered or achieved the learning standards.

Effectiveness of 5E Inquiry Learning Model

Abdi (2014) researched the effect of 5E Inquiry Learning Model by Bybee et al. (2006) on the science achievement of Year 5 female students in Kermanshah, Iran. The quasi-experimental pretest-posttet control group research design was employed. Two intact classes, each consisting of 20 female students, were randomly assigned as the experimental and the control groups.

The experimental group was "instructed with inquiry-based instruction supported 5E learning cycle" (Abdi, 2014, p. 39), while the traditional method was taught using the traditional method by the same teacher over an intervention period of 8 weeks. Three units were used as the context to the study, namely the microorganisms; nervous system; and human & environment. The 30 teacher-made multiple-choice science achievement test was administered as the pretest as well as the posttest. The test has an internal consistency reliability with its Cronbach's alpha measuring at 0.75 and an appropriate content validity which was endorsed by two science teachers. The result from the *Analysis of Covariance* (ANCOVA) indicated that there was a statistical significant difference, favouring the experimental group.

Meanwhile, Wilson et al. (2010) conducted a laboratory-based control study to gauge the effectiveness of 5E Inquiry Learning Model on science achievement among 58 students aged 14-16 years old. The true experimental design was employed when Wilson et al. (2010) randomly assigned students into one of two groups: experimental and control, and both groups were taught similar learning objectives by the same teacher. The experimental group was taught using the 5E Inquiry Learning Model, while the control group was taught using the teacher-centred conventional approach. The findings indicated that students in the experimental group achieved markedly higher than their peers in the control group.

Hokkanen (2011), in her master's thesis, ascertained if the use of the 5E Learning Cycle Model could improve student science achievement, as compared to the commonplace method. There were 96, 98 and 114 7^{th} grade students responded to the pre- and posttest for the respective three units of instruction: (i) atoms, (ii) force & motion, and (iii) speed & motion graphing. The experimental study lasted 3 weeks and the 57-item *Illinois State Achievement Test* (ISAT) was used to measure the science achievement. The findings revealed that when "the average percentage of improvement for each question was determined and compiled …, greater gains were noted by the students taught within the 5E model" (Hokkanen, 2011, pp. 30-31).

As a summary, the effectiveness of 5E learning cycle was variously investigated across different ages of students (e.g., Abdi, 2014; Hokkanen, 2011; Wilson et al., 2010) in non-Malaysian contexts. The analysis from the literature review on the effectiveness of 5E Inquiry Learning indicates that, while the effectiveness research in the non-Malaysian contexts are prevalent, such line of inquiry in the Malaysian context is still infrequent and hence the urgent need of such a research to expand repertoire of knowledge on the effectiveness of 5E Inquiry Learning Model, particularly within the Malaysian context.

METHODOLOGY

Based on the research question, the quasi-experiment pretest-posttest control group research design (Creswell, 2012) was deemed appropriate. Given the availability of two intact classes, each consisting of 20 students, one of the classes was randomly assigned as the experimental group while another class as the control group. The aim of using intact classes was to maintain the ecosystem of the school with minimal disruption. The second author taught both the experimental and control groups to evade any teacher effect. Table 3 summarizes the descriptive statistics of participating students.

Table 3. Descriptive Statistics of Participating Students

		Gender		
		Male	**Female**	**Total**
Group	Control	7	13	20
	Experiment	9	11	20
Total		16	24	40

Prior to the intervention, the teacher administered the, and after the intervention, she administered the posttest. The posttest was similar to that of the pretest, and both comprised 12 multiple-choice items and 8 fill-in-the-blank items. Each multiple-choice item consists of one correct response and three distractors. Each of the 8 completion items requires students to give a correct response. Hence, all these items are marked dichotomously, either correct or incorrect. The developed items matched with the learning objectives identified in a test specification table. To enhance the content validity, the test items were examined by two science expert teachers. The test has sufficient internal consistency reliability measured by KR20 with the value of 0.62 (De Vaus, 2001; Nunnally, 1978).

To comply with the research ethics, the teacher (i.e., second author) sought the permission from her headmaster to use her existing two intact science classes as research samples. A positive response was received from the headmaster, indicating that the research could be conducted. Upon the approval, the two classes were given the pretest six weeks before the intervention. The intervention lasted three 30-minute periods, and the posttest was then administered.

For the analysis of data, firstly, the pretest data would be analysed using the independent samples t-test to establish the group equivalence in terms of initial student achievement (Creswell, 2012). If the result were not statistically significant which indicates that the two groups were equivalent in term of initial achievement, the posttest data would then be analysed using the independent samples t-test. However, if the analysis of pretest data was statistically significant, then the posttest data would be analysed using ANCOVA (Analysis of Covariance) with the pretest data serving as a covariate.

RESULTS

Table 4. Mean, Standard Deviation and Results of t-test for Pretest

Variable	Experimental			Control				
	N	Mean	SD	N	Mean	SP	t	p
Pretest	20	12.90	3.11	20	11.60	1.60	1.66	.108

As shown in Table 4, the analysis of pretest data indicates that the pretest mean for the experimental group which had undergone the 5E inquiry learning was 12.90, while the pretest mean for the control group was 11.60. Although there was a mean difference of 1.30, the difference was not statistically significant (t = 1.66, p =.108 > .05). Such a result implies that the initial difference in terms of science achievement between the groups was not statistically significant. Therefore, posttest data could be analysed using an independent samples t-test given the equivalence of the two groups.

Table 5. Mean, Standard Deviation and Results of t-test for Posttest

Variable	Experimental			Control				
	N	Mean	SD	N	Mean	N	t	p
Posttest	20	16.05	2.35	20	13.15	1.39	4.75	.000

As shown in Table 5, the analysis of posttest data indicates that the posttest mean for the experimental group was 16.05, while the posttest mean score for the conventional group was 13.15. Statistically, the difference of 4.75 (p =.000 < .001) was real and significant. Therefore, the null hypothesis -- there was no statistical difference between the achievement in the learning of “Magnet” among Year 3 Malaysian students who have followed through the 5E Inquiry Learning Model and the achievement in the learning of “Magnet” among the Year 3 Malaysian students who have followed through the conventional teacher-centred teaching -- was not accepted. This implies that the posttest difference between the two groups, favouring the experimental, was indeed a real difference and that it happened as the result from the intervention.

DISCUSSION

This study aimed to determine the effect of 5E Inquiry Learning Model on the achievement in the learning of “Magnet” among Year 3 Malaysian students. The main finding of this study shows the positive and beneficial effect of using 5E Inquiry Learning Model on students’ achievement in the learning of “Magnet”. Such a positive and beneficial effect is consistent with the findings of Abdi (2014), Hokkanen (2011), Wilson et al. (2010), Veloo et al. (2013) and Wu and Hsieh (2006) although each of the studies measures the science achievement differently, and that diverse age groups were used.

The science achievement in this study was measured by means of a composite score deriving from the students' responses to the 12 multiple-choice and 8 fill-in-the blank items. This may suggest that the present study failed to explore other important aspects in science achievement. For example, in this era of the 21st Century which emphasises critical thinking, creative thinking, collaboration and communication which have been famously considered together as the four C's, could the inquiry-based science education enhance these four C's?

The 5E inquiry learning implemented in this study entails hands-on activities in the science room such as testing the predictions on whether or not an object is attracted by a magnet. In other words, the use of inquiry learning in this study takes the form of hands-on science investigative activities, and that this hands-on 5E inquiry learning had a positive and beneficial effect on students' learning of science. By means of extrapolation, the finding of this research corroborates other positive and beneficial impacts of hands-on activities and student investigations on students' learning in science (e.g., Jaakkola & Nurmi, 2008; Klahr, Triona, & Williams, 2007; Shymansky, Hedges, & Woodworth, 1990).

However, science teachers are facing many barriers which inhibit the integration of inquiry-based science teaching in their classrooms that include "… the poverty of [science teachers'] common professional development experiences, … and definitions for what inquiry-based teaching actually is, and the lack of good resources enabling the capacity for change (Fitzgerald, Danaia, & McKinnon, 2019, p. 543). Barrow (2006) suggests that a consensus on the notion of inquiry should be reached so as to pave the way forward for the pedagogical courses at pre-service teacher education. Additionally, the in-service professional development programs for the science teachers and lecturers on the what, why and how of inquiry-based science teaching should be adequately provided (Akerson et al., 2007; Akerson & Hanuscin, 2007; Barrow, 2006; Silm et al., 2017; Zohar, 2008).

In terms of in-service professional development (PD) programs, Ingvarson et al. (2005) have proposed five characteristics of effective PD in that it should focus on content, entail active learning, offer feedback, entail collaborative examination of student work, and should involve long-term follow-up. Content wise, it should be on the various approaches and models of inquiry learning. Perhaps due to time constraint, we could concentrate on the 5E Inquiry Learning Model for a start. The PD should entail active learning where participants simulate through the 5E Inquiry Learning Model where they assume the role of a student while the facilitator acts as a teacher. Such simulative training is what we termed as modelling the model where the facilitator explicitly model for their participants the pedagogical thoughts and actions that underpin the phases in the 5E Inquiry Learning Model. To show the grasp of the 5E Inquiry Learning Model, the participants could plan a lesson around the use of 5E Inquiry Learning Model and then carry out the plan either with their colleagues or other participants acting as students, or with their real students in their respective schools. Facilitator or other senior teachers serving as mentors could observe and provide at-the-elbow support and immediate feedback. As for collaborative examination of student work, the participants could be brought “together in the workplace to examine student work and to provide opportunities for feedback … [which] requires an appropriate balance between up front practice and back room collegial analysis and reflection on practice in the light of standards for student learning and professional practice” (Ingvarson et al., 2005, p. 18). Such learning is definitely a long term process.

Finally, the findings of this study were derived only from the Year 3 Malaysian students in a particular school. As such, more studies investigating similar impact of 5E Inquiry Learning Model should be conducted by using a more representative Malaysian Year 3 students and perhaps be expanded across the primary years so as to establish a more validity generalisation of its positive impact.

CONCLUSION

Based on the discussion in the preceding sections, it can be concluded that the use of the 5E Inquiry Learning Model is indeed successful in enhancing students’ achievement in the learning of science. In other words, the science learning and teaching process through 5E Inquiry Learning Model is more effective as compared to the conventional model in enhancing the science achievement among primary students, particularly on the concept of magnet. This positive effect on student achievement is attributed to the judicious employment and enactment of a teaching and learning process that truly and aptly integrates the 5E Inquiry Learning Model.

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