Teaching Practices of Malaysian Science Teachers: Role of Epistemic Beliefs and Implicit Intelligence

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ABSTRACT

The present study investigated how science teachers' beliefs about intelligence and their beliefs about knowing and knowledge acquisition influence their teaching practices.A total of 285 science teachers participated in the present study.Our survey included three parts, namely: epistemological beliefs inventory, implicit theories of intelligence scale, and teaching practices scale. Results revealed that: (1) Malaysian teachers hold more eclectic beliefs in which they viewed teaching as a combination of student-directed along with some teacher-centered learning.; (2) Malaysian teachers hold sophisticated epistemological beliefs (3) Malaysian teachers were incremental theorists; (4) Teachers who hold sophisticated epistemic beliefs and incremental theoristswere more likely to adopt student-centered practices; and (5) Teachers teaching practices are antecedents of epistemic beliefs and implicit intelligence beliefs variables.In conclusion, the present study shed light on how teachers' beliefs influence their preference for teaching practices identified as either student-centeredor teacher-centered.

Keywords: *reliability, item analysis, construct validity, uni-dimensionality*

INTRODUCTION

In the present study, we combined three research traditions, epistemological beliefs (EPIST), implicit theories of intelligence (IMPLS), and teaching practices (TPRACT) of Malaysian science teachers, by exploring the contributions of EPIST and IMPLS to teachers adoption of TPRACT. Research has linked students' beliefs about their intelligence, learning and knowledge with teaching approaches (Luft & Roehrig, 2007; Maggioni & Parkinson, 2008). According to Shunk (2006), the cognitive learning theories shifted focus to the diverse psychological constructs such as attention, perception, encoding, storage, and retrieval of knowledge. Even so, missing from many cognitive descriptions of learning is a consideration of how learning process is influenced by an individual's beliefs system (Epler, 2011). According to Muis and Foy (2010), EPIST influence a variety of cognitive processes and, ultimately, teaching and learning.As such, examining teacher's beliefs provides a means for understanding the relationship between beliefs and student outcomes, and it also provides insight into teachers' classroom practices (Kagan, 1992; Muis & Foy, 2010). In describing this relationship, Pajares (1992) noted, "Few would argue that the beliefs teachers hold influence their

perceptions and judgments, which in turn, affect their behavior in the classroom" (p. 307). In fact, Kagan (1992) reported, "a teacher's beliefs usually reflect the actual nature of the instruction the teacher provides to students" (p. 73).

Researchers have illustrated the variation of teachers' beliefs about their intelligence, and their work supports the claim that a teacher's beliefs about their intelligence influence planning, teaching, and the type of assessment strategies used (Deemer, 2004; Garcia-Cepero & McCoach, 2009). Additionally, teachers' beliefs about learning and knowledge influence how they approach teaching (Brownlee, Purdie, & Boulten-Lewis, 2001; Tickle, Brownlee, & Nailon, 2005). Specifically, there is a significant relationship between teacher's EPIST and their tendency to adopt specific TPRACT (Chan, 2003; Luft & Roehrig, 2007; Maggioni & Parkinson, 2008). Clearly, EPIST carry important implications for students and teachers alike. For instance, Chan and Elliot's (2004) research indicate that ominscient authority and certainty of knowledge are both related to traditional teaching (TT), whereas, ominscient authority is negatively related to the conception of constructivist learning (CT). As such, the present study was conducted to explore the relationships between EPIST, IMPLS, and teacher TPRACT among in-servic science teachers. Finally, the results of this study can help educational researchers, teacher educators, and school administrators determine the effectiveness of interventions designed to facilitate the change of teachers' beliefs. Because an individual's beliefs vary in strength and can be resistant to change, Mansour (2009) pointed out that the possible effects of teachers' beliefs on TPRACT creates a crucial question: "how can teachers' beliefs be affected or changed?" (p. 37).

Teaching Practices (TPRACT)

For decadestradisional teaching (teacher-centered: TT) approach has been the most common and primary mode of teaching learning used in Malaysian educational system. This teacher-centric way of teaching approach is the 'chalk and talk' method. Textual (printed books) is mainly used as the instructional medium. Basically, the teacher regarded as the source of expert knowledge that controls the whole instructional process. The teacher emphasizes factual knowledge and delivers the content to the class, while what students have to do are listen to the teacher. Therefore, the learning are more passive and the learners less active in their learning process. The focus is on the content, for example, how much material has been delivered and learnt by students. Although this approach has its merits towards students' learning, it has limited advantages in current rapidly changing world. Since students mostly involve in rote learning and memorization, as times goes by, students not only losing the ability to communicate with others, they might also lack of analytical thinking skills and become poor in making long-term planning. Recently, Malaysia Ministry of Education has realized the way science curriculum implemented in schools might be the cause of unsuccessful achievement of the mission and vision of Malaysian science education. Therefore, new teaching-learning practice and strategies have been suggested in current science Curriculums. These new teaching practices and strategies include Mastery Learning, Inquiry-discovery Learning, Contextual Learning and also Constructivism Teaching Approach.

Undoubtedly, Jean Piaget is the main pioneer of Constructivism theory. Constructivism suggests individual to actively seek for knowledge, instead of receiving information passively (Piaget, 1977). To construct understanding and knowledge towards the world, individual have to experience themselves, and then relate it to own past experience or prior knowledge. But why do we have to be active creator for our own knowledge? Piaget explains that when learners experience a situation where new knowledge is conflict with current scheme of knowledge, a state of disequilibrium has been occurred. In this case, learners have to alter own self's thinking or concept to reach equilibrium. There are two methods to help learners to reach equilibrium. First, learners have to make sense of new knowledge by assimilating it to the existing knowledge. Second, if unable to do so, learners have to restructure the existing concept of thinking or create a new scheme to accommodate the knowledge (Piaget, 1977). This resulting cognitive disequilibrium can help to stimulate deep questions, explanations, reasoning and problem solving. (McComas, 2014). Thus, students can better understand the concept and retain knowledge longer.

Constructivist classroom is a student-centered classroom. Students learn at their own pace, so that they can monitor their own learning processes. Teacher plays the role as facilitator who guides and prompts students, and leads them to draw conclusion. In this learning approach, the processes of understanding are emphasized. Furthermore, constructivist learning sessions relies heavily on collaboration among students.

Students primarily work in groups, and the learning environment is usually interactive, dynamic and democratic.

Epistemological Beliefs (EPIST) and implicit intelligence (IMPLS)

In the 1990s, Schommer (1990) criticized the Perry's general concepts of developmental and sequential stages and suggested totally different perspectives about epistemology. According to Schommer's, concepts of personal epistemology is a belief system that is composed of several more or less independent dimensions (Schommer, 1990). She hypothesized five beliefs as the certainty of knowledge (knowledge is certain rather than tentative), the structure of knowledge (Knowledge is simple rather than complex), the source of knowledge (knowledge is handed down by authority rather than derived from reason), the control of learning (the ability to learn is innate rather than acquired) and speed of learning (learning is quick or not at all rather than gradual) acquisition. She identified classification of beliefs along each dimension, beliefs as being naive or sophisticated. For example, an individual's belief regarding to the structure of knowledge can range from believing that knowledge is simple to believing that knowledge is complex. Believing that knowledge is simple is considered naive, while believing that knowledge is complex is considered sophisticated. These sophisticated beliefs support high-quality study strategies, Teaching practices, comprehension, interpretation, and high-quality problem solving (Epler, 2011; Schommer-Aikins & Hutter, 2002). Epistemic beliefs found tobe positively and significantly related to IMPLS. Accordingly, epistemic (EPIST) beliefs and implicit intelligence (IMPLS)are intimately tied to each other and both have been found to be related to several important aspects of teaching and learning aspects (Epler, 2011; Braten & Stromo, 2005). Implicit theories of intelligence are individuals' beliefs about their own intelligence (Dweck, 2012). He describes a growth mindset as one in which a person believes that his/her intelligence is malleable and can grow. Dweck (2006), labeled students who hold an implicit belief that ability is a fixed state as entity theorists and those who implicitly believe that ability is a malleable trait as incremental theorists.

Problem statement

Research in teachers education shows that teachers' EPIST, IMPLS, attitudes, and pedagogical beliefs related to teaching and learning are central to understanding not only why teachers teach as they do, but also how their students learn. In addition, research shows that teachers' beliefs (EPIST and IMPLS) and their preferences for certain classroom practices affect not only their learning processes, but also their future professional development in their teaching careers. As a result, investigating and understanding teachers' EPIST and IMPLS can help improve their professional development and TPRACT.

A large body of research examining IMPLS has been connected with student's beliefs and the impact on student achievement, motivation, and outcomes (Garcia-Cepero & McCoach, 2009). However, it is possible that a teacher's IMPLS impacts how they teach. Yet, there remains a much smaller body of research examining the relationship between teacher beliefs (i.e., EPIST and IMPLS and their TPRACT (Epler, 2011; Deemer, 2004). According to Braten and Stromso (2005), the influence of EPIST and IMPLS on TPRACT is essentially unanswered. Therefore, the need for researchers to explore the relationship between teachers' implicit beliefs (i.e., EPIST and IMPLS) and their TPRACT is vital (Epler, 2011; Hofer, 2001). Furthermore, the present study consider the first attempt to study the pattern of relationships between IMPLS, EPIST, and TPRACT among in-service Malaysian teachers. Specifically, we tried to answer the following questions: First, what is the contribution of EPIST to adoption of teachers' TPRACT? Second, what is the contribution of IMPLS to adoption of teachers' TPRACT?

Samples

Using a multi stage sampling procedure, a total of 285 Sience teachers from 70 schools in Kuala Lumpur participated in the present study. Table 1 shows the distribution of participants by gender, age, experience, school level, and academic qualification. Nine percent are males, eighty one percent are females, thirty eight percent are lower secondary schools, sixty two percent are upper secondary school teachers, sixty two percent from Bachelor Degree and thirty eight percent respondent are from higher degree than Bachelor Degree.

Table 1 Distribution of Participants by Gender, Age, Experience, School level, and Qualification

Variable		Number	Percentage
Gender	Male	26	9%
	Female	259	81%
Age	21-30 years	109	38%
	31-40 years	98	34%
	41-50 years	55	19%
	51-60 years	23	9%
Experience	0-10 years	97	34%
	11-20 years	72	25%
	21-30 years	50	41%
School Level	Low secondary school	107	38%
	Upper secondary school	178	62%
Qualification	Bachelor Degree	178	62%
	Higher than Bachelor Degree	107	38%

Instruments

This research survey included three measures. The 32 items, Epistemological beliefs (EPIST) Inventory(Schraw, Bendixen, & Dunkle, 2002) assessed innate ability (INA), quick learning (QUL), structure of knowledge or simple of knowledge (STK), certainty of knowledge (CER), and omniscient authority (OUA). Using confirmatory factor analysis, we replicated that the EPIST dimensions OUA (5 items; Reliability was at .80), STK (8 items; Reliability was at .79), QUL (5 items; Reliability was at .77), CER (7 items; Reliability was at .84), and INA (7 items; Reliability was at .89) are measured with EPIST inventory. The items: 2, 6, 14, 20, 24, 30, and 31 were reversed coded. Lower scores represent more naive epistemological beliefs and higher scores represent more advanced epistemological beliefs.

To assess teacher's IMPLS, Implicit Theories of Intelligence (IMPLS) Scale (Grant & Dweck, 2003) was used. The questionnaire composed of 8 items and uses a 6-point Likert scale item response format, with 1 as strongly disagree and 6 as strongly agree. Confirmatory factor analysis replicated that the IMPLS Scale (Entity theory of intellegence (ENT); 4 items; reliability was at .89) and (incremental theory of intellegence (INC); 4 items and reverse coded; reliability was at .83) dimensions are measured with IMPLS Scale.Lower scores represent entity theorists and higher scores represent incremental theorists (Dweck, 2000).

In the final questionnaire have a 5-point Likert type scale (1=never to 5=use a great deal) designed to measure how often teachers use eight specific teaching practices, namely: demonstrations (DEM), experiments (EXP), group projects/assignments (GRp), independent assignments (INA), lecture (LEC), role-play (ROP), small group/partner discussion (PAR), and teacher-led discussion (TLD). The eight teaching practices classified into two categories, namely: teacher-centered practices (TEC) and student-centered practices (STC).

RESULTS

Teaching Practices Profiles

Before further statistical analysis, the researchers examined the assumption of normally distributed data for the teaching practices scores, EPIST Scale, and the IMPLS Scale. Skewness valuesand histograms for the three components of the questionnaire were examined, and it was determined that the data were normally distributed (see Table 2). As we seen in Table 2, Malaysian teachers often (more frequent) use of EXP practice (Mean= 3.85; SD=.98), INApractice(Mean=3.71; SD= 1.08), DEMpractice (Mean=3.60; SD= .91), PAR practice (Mean=3.57; SD= .98), and GRP practice (Mean=3.57; SD= 1.00). In contrast, Malaysian teachers seldom prefered to use LECpractice (Mean=1.98; SD= 1.01),and TLD practice (Mean=1.86; SD= .94), whereas, Malaysian teachers sometimes prefered to use ROP practice(Mean=3.02; SD= 1.11). In general, Malaysian

teachers were more often prefered to use STC practices (Mean= 3.50; SD= 3.32), and sometimes prefered to use TEC practices (Mean= 2.79; SD= 1.96).

Table 2 Descriptive statistics with respect to Teachers' epistemological beliefs, Implicit Intelligence, and Teaching Practices

	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Std. Error
Demonstrations (DEM)	3.60	.91	-.21	.14
Experiments: (EXP)	3.85	.98	-.07	.14
Group Projects (GRP)	3.57	1.00	-.16	.14
Independent Assignment (INA)	3.71	1.08	-.14	.14
Lecture (LEC)	1.98	1.00	.49	.14
Role-Play (ROP)	3.02	1.11	.08	.14
Small Group/Partner Discussion (PAR)	3.57	.98	-.11	.14
Teacher Led Discussion (TLD)	1.86	.94	.35	.14
Teacher-Centered (TEC)	2.79	1.96	-.10	.14
Student-Centered (STC)	3.50	3.33	.01	.14

IMPLS and EPIST Profiles

To find out the levels of IMPLS and EPIST Malaysian teachers, descriptive statistics were conducted to calculate means scores, and standard deviations for the responses to IMPLS survey items and EPIST inventory.The results revealed that Malaysian teachers were slightly agreed with incrementaltheories of intelligence. In this case, Malaysian teachers were classified as incremental theorists (Dweck, 2000). For EPIST, Malaysian teachers were hold less naive beliefs about ominscient authority, quick learning, innate ability, simple knowledge, and certain knowledge.

Correlation Analysis

The Pearson Product Moment correlation coefficients were used to represent the relationship between Epistemological Beliefs (EPIST), Implicit Theories of Intelligence (IMPLS), and the eight teaching practices (ie. Demostrations, experiments. Group project, independent assignments, lecture, role-play, small group/partner discussion, teacher-led discussions(TPRACT) of Malaysian teachers (Table 3). In general, the relationship between EPIST and TPRACT ranging from negligible to low The correlations show a statistically significant relationship between the EPIST and two of the eight TPRACT. There was a positive, low significant relationship between EPIST and PAR practice. In other words, the more frequently the participants indicated they used PAR practice in their classrooms, their EPIST inventory scores increased. There was also a weak, positive relationship between EPIST and ROP practice. The more likely teachers indicate they utilize role-play practice (ROP) practice in their classrooms, their EPIST inventory scoresincreased. Further, the correlations show a statistically significant relationship between IMPLS and two of the eight teaching practices. There was a low, positive relationship between IMPLS and experiments (EXP) practice. In this case, the more frequently teachers indicated they use EXP practice, their IMPLS scores increased. There was also a low, positive relationship between IMPLS and PAR practice. In other words, as IMPLS scores increased, the teachers indicated more frequently using small group/partner discussion (PAR) as a teaching practice. There was also a low, positive relationship between the IMPLS and student-centered (STC) practices. In other words, as IMPLS scores increased, the teachers indicated more frequently using STC practices. In general, the relationship between IMPLS and TPRACT ranging from negligible to low.

Table 3 Pattern of Relationships between TPRACT and Both of EPIST and IMPLS

Variable	Epistemological Beliefs	Implicit Intelligence
Demonstrations (DEM)	.095	.060
Experiments: (EXP)	-.051	.127*
Group Projects (GRP)	.062	-.031
Independent Assignment (INA)	.004	.098
Lecture (LEC)	-.021	..065
Role-Play (ROP)	.122*	-.003
Small Group/Partner Discussion (PAR)	.142*	.173**
Teacher Led Discussion (TLD)	.026	.102
Teaching Practices (TPRACT)	.070	-.025
Teacher-Centered (TEC)	.046	.076
Student-Centered (STC)	.087	.166**

Canonical Correlation Analysis

Canonical correlation analysis was performed to assess the pattern of relationships between IMPLSand EPIST as predictors of the eight TPRACT of Malaysian teachers. In canonical correlation analysis, the Standardized Canonical Coefficients (coefficients) can be interpreted like regression weights (Beta). Canonical Loadings (structure coefficients)are the correlations between each item and the linear combinations of variables for that same set (Leech, Barrett, & Morgan, 2011). The tests of dimensionality for the canonical correlation analysis, indicate that one canonical dimension is statistically significant.Furthermore, the canonical correlation was .24, representing the 5.7% overlapping variance.

Canonical correlations between the set of beliefs variables (i.e., EPIST and IMPLS) and the set of TPRACT variables are presented in Table 4. The results of canonical correlation analysis showed that teachers' scores on the independent variables scales (EPIST and IMPLS) and on TPRACT were somewhat related. With a cut-off correlation of .30, an examination of the loading in Table 5 illustrate that the criterion synthetic variable for the first canonical dimension was primarily defined by PARpractice (r_s = .605), EXPpractice (r_s = .528), and GRPpractice (r_s = .304). Specifically, approximately 36.6% of the variance in PAR practice was shared with the canonical variate, 27.9% of the variance in EXP Practice 5 was shared with the canonical variate, and 9.2% of the variance in GRPpractice practice was shared with the canonical variate. Regarding the predictor variables, both the IMPLS (r_s = .828) and EPIST (r_s = .652) contributed to predict canonical variate. Furthermore, approximately 68.8.% of the variance in IMPLS was shared with the predictor variate, and 42.5%of the variance in EPIST was shared with the predictor variate. Because the structure coefficient (loading) for IMPLS was positive, it was positively related to PAR practice, EXPand GRP practice. This indicates that higher scores on IMPLS scale were associated more frequent use of PAR practice, EXP practice and GRPpractice. In general, incremental theorists teachers were more likely to adopt PAR practice, EXP practice. and GRPpractice.Furthermore, the structure coefficient (loading) for EPIST was positive, it was positively related to PAR practice, EXP practice. and GRP practice. In this case, higher scores on EPIST inventory were associated more frequent use of PAR practice, EXP practice,and GRP practice. In other words, teachers who hold sophistecated EPISTwere more likely to adopt PAR practice, EXP practice and GRP practice. In general, incremental theorist and less naive beliefs teachers were more frequent use student-centeredSTC practices.

Table 4 Correlation and Standardized Canonical Coefficients Between TPRACT and Teachers Beliefs

Variables	Loading (r_s)	$(r_s)^2$	Coefficient
Teacher Beliefs			
Epistemology (EPIST)	.652	.425	.565
Implicit Theories of Intelligence (IMPLS)	.828	.686	.763
Teaching Practices			
Demonstrations (DEM)	.031	.001	.264
Experiments (EXP)	.528	.279	.682
Group Project (GRP)	.304	.092	.259
Independent Assignment (INA)	.299	.089	.217
Lecture (LEC)	.145	.021	.586
Role-Play (ROP)	.247	.061	.490
Small Group/Partner Discussion (PAR)	.605	.366	.153
Teacher Led Discussion (TLD)	.266	.071	.032
R_c^2	.057		

Regression Analysis

To further understand the influence the IMPLS Scale and EPIST Inventory have on student-centersd practices, we conducted a forced-entry regression to determine the amount of variance explained by the model. As such, we computed multiple regression equation with the student-centersd practices variable as outcome measure (dependent variable). The results are shown in Table 5. As we can seen in Table 5, EPIST measure were positively related to student-centered practices (beta= .125; $p<.05$; R2 = .032). In general, teachers who hold less naive beliefs about knowing and knowledge were more frequently prefered to use student-centered practices. Further, IMPLS measure were positively related to student-centered practices (beta=.174; $p<.05$). In general, incremental theorists teachers were more frequently prefered to use student-centered practices. Regarding teacher-centersd practices,we conducted a forced-entry regression to determine the amount of variance explained by the model. As such, we computed multiple regression equation with the teacher-centersd practices variable as outcome measure (dependent variable). The results are shown in Table 5. As we can seen in Table 5, both EPIST measure and IMPLS measure were not predictors of teacher-centersd practices.

Table 5 Results of Regression Analyses

	Epistemology		Implicit Intelligence		R^2	*F*-value
	B	Beta	B	Beta		
Student-centered	.137	-.125*	.122	.174**	.032	4.574
Teacher-centered	.092	.097	.104	.087	.016	2.136

Discussion

Results revealed that Malaysian teachers were prefered to use experiments practice, independent assignment practice, demonestration practice, small group/partner discussion practice, and group project practice. In contrast, Malaysian teachers were seldom or sometimes prefered to use role-play practice, lecture practice, and teacher led discussion practice. In general, Malaysian teachers had both constructivist (student-centered) and traditional (teacher-centered) teaching practices, but the majority of the participants had more student-centered practices interms of affective dimensions of teaching and learning. In other

words, Malaysian teachers hold more eclectic beliefs in which they viewed teaching as a combination of student-directed along with some teacher-centered learning. These results attribute to teachers beliefs aboutscience curriculums, or what to teach and what to be learned, and beliefs about how to teach or class room climate. Practically, students differed in their abilities, intelligence, learningneeds, construct knowledge, and ways of learning. As such,teachers should use different teaching practices in order toprovide support for the differences among students so that all students could easily learnthe lesson objectives.In Malaysian Educational system, what students learn and what the teacher teaches are decided by MOE (Ministry of Education, Malaysia). Teachertaught and what the students learned, based on the national curriculums, are tested byschool summative and formative assessments as well as public examinations namely, PMR (Lower Certificate of Examination), SPM (Malaysian Certificate of Examination) and STPM (Malaysian Higher School Certificate) results. As a result, science teachers are responsible for teaching national science curriculumscontents so that their students can continue their education.

Furthermore, results revealed that Malaysian teachers were more frequent use student-centered practices (Mean= 3.46).In Malaysian context, educational programs have covered the changes in educationalmaterials, and teaching approaches based on constructivist philosophies and student-centered pedagogies to increase the quality of teacher professional development and enhancethe influence of contemporary knowledge and skills. Further, Teachers' personal characteristicssuch as interpersonal skills, practice-related skills (reflection, critical thinking, and problem solving in the educational process), and awareness of their responsibility to besocial and moral role models are of course a very important requirement forimplementing student-centered practices. In recent years, the educational system has undergone dramatically changes and development. During those changes and development, a number of new educational policies have been formulated and implemented. Those changes have a great impact on the teaching profession because teachers are the ones that practically implemented the educational policies and reforms. In addition, the transformation of the National Mission in Malaysian Education system also had focusing in teachers' professional development. Two major sequences Educational Blueprint was highlighted the important aspect of the teaching profession. The 2006-2010 Education Development Master Plan with six cores noted the fifth cores as to "improving teaching profession". The fifth core focused on producing quality teachers to remain in the education system and the quality remain in time of service, to meet the needs of most of the teachers intellectual, spiritual, physical and emotional aspects (Soon, 2007).Teachers' professional development is reviewed thoroughly to transform teaching into the profession of choice. Meanwhile recently, there are also big changes in curriculum context where, school based curriculum is utilized in Malaysia Education System. Therefore, the teacher plays various roles in teaching and learning context; as a moderator, counsellor, tester and examiner apart from their core business which is teaching. In these various roles, teachers expose in many complex situations that need them to think, observe, plan and act accordingly.

With respect to implicit theories of intelligence, Malaysian teachers were classified as incremental theorists.According to social-cognitive theory of motivation (Dweck's, 1986; Dweck & Leggett, 1988), Malaysian teachers are mastery oriented. For epistemological beliefs, Malaysian teachers were hold sophistecated beliefs about learning and nature of knowledge acquisition.As such, knowledge is: complex; derived from reason; tentative. Further, the ability to learn is acquired and learning is gradual.These results can attributes to the age, educational qualification, experiences of the teachers, science curriculums, teacher's pedagogical beliefsand active participation and reasoning (Epler, 2011; Hofer & Pintrich,1997; Hofer, 2002; Schommer-Aikins, 2002; Perry, 1999).

Results from cannonical correlation and regression analysis revealed that teachers who hold sophisticated beliefs about knowing and knowledge acquisitionwere more frequent use experiments practices, group project, small group/partner discussion practice, and student-centered practices.Furthemore, incremental theorists teachers were more frequent use experiments practices, group project, and small group/partner discussion practice, and student-centered practices.In general, student-centered teaching practices were antecedents of epistemological beliefs and implicit ability.To meet the demands and challenges in this era of globalization, education system in Malaysia has recently gone through countless changes, specifically in the areas related to curriculum, assessment, teacher training, monitoring as well as teaching and learning approaches. Along with the implementation of new science curriculums, new

teaching practices and strategies such as mastery learning, inquiry-discovery learning, contextual learning and constructivism teaching approach have been suggested.In this case, Malaysian teachers tend to share authority with their students in two ways communication and play the role as a facilitator of knowledge.These results partially support the past studies (e.g., Epler, 2011; Chan and Elliot,2004; Maggioni & Parkinson, 2008). Forinstance, Epler (2011) indicated that participants with more sophisticated epistemological beliefs and incremental theorists used to adopt student-centered teaching practices more frequently. Maggioni & Parkinson (2008) reported that teachers with advanced epistemological beliefs are more likely to approach teaching and learning from a constructivist perspective. Furthermore, our results support Chan and Elliot (2004) views about teaching practices and epistemology. They indicated that teachers' teaching practices are should be driven by their epistemological beliefs.

CONCLUSION

In the present study, Malaysian teachers were more frequently use student-centered practices, but they were less frequentlyuse role-play practice. This may be attributes to the teaching science discipline. As such, there is a need to clarify the impact of teachers' conceptions (or misconceptions) about their content knowledge of science on the teaching practices. Further,the findings presented illustrate that Malaysian teachers possess advanced beliefs about implicit intelligence, knowing, and knowledge acquisition. Further, the present study investigated how science teachers' beliefs about intelligence and their beliefs about knowing and knowledge acquisition influence their teaching practices. The research results support the claim that teachers' beliefs about intelligence and epistemological beliefs may influence their teaching practices. Specifically, the findings indicate that there is a relationship between teacher beliefs and three out of eight teaching practices. For better understanding this relation,there is a need to conduct a qualitative study to determine the influence teachers' beliefs have on teaching practices. Finally, it is important to further clarify the relationship and how each dimension of epistemological beliefs (i.e., innate ability, structure knowledge, certain knowledge, source of knowledge, and quick learning) and Implicit Theories of Intelligence (entity ability and incremental ability) affects teaching practices. Therefore, teachers'beliefs about intelligence, knowing, and learning could provide a window for understanding their instructional practices.

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