

*Journal of Nusantara Studies* 2020, Vol 5(1) 255-269

Universiti Sultan Zainal Abidin

ISSN 0127-9386 (Online)

<http://dx.doi.org/10.24200/jonus.vol5iss1pp255-269>

---

## DUAL LANGUAGE PROGRAMME: TEACHERS' BELIEFS AND PRACTICES IN TEACHING SCIENCE THROUGH ENGLISH

\*<sup>1</sup>Juliana Othman, <sup>2</sup>Rohaida Mohd Saat, <sup>3</sup>Fatiha Senom & <sup>4</sup>Durriyyah Sharifah Hasan Adli

<sup>1,2,3</sup> Faculty of Education, University Malaya, 50603 Kuala Lumpur, Malaysia

<sup>4</sup> Faculty of Science, University Malaya, 50603 Kuala Lumpur, Malaysia

\*Corresponding author: [juliana@um.edu.my](mailto:juliana@um.edu.my)

Received: 8 May 2019

Accepted: 8 Jan 2020

### ABSTRACT

**Background and Purpose:** The recently implemented Dual Language Program (DLP) policy in Malaysian schools may require teachers involved in the initiative to make necessary changes in their teaching practices in appropriate directions. It may also challenge the beliefs that these teachers hold with regard to teaching subject matter in English as a medium of instruction. Thus, this study seeks to investigate the beliefs of primary Science teachers with regards to the teaching of Science through the English medium, and the extent to which the beliefs of teachers are consistent with their classroom practices.

**Methodology:** The study employed a quantitative data collection and analysis approach. Science teachers' beliefs and stated practices were obtained via a questionnaire using the Likert-scale. The respondents of the study include 44 primary Science teachers in Kuala Lumpur and Selangor, Malaysia. A Pearson correlation analysis was computed to examine the association between teachers' beliefs scale and the ratings of classroom practices.

**Findings:** The results from the statistical analysis suggest that in teaching Science using the English language, the beliefs of the primary school teachers were not always aligned with their stated practices with regard to DLP. This discrepancy between the beliefs of science teachers and their stated instructional practices could be due to the lack of professional development sessions and contextual constraints.

**Contributions:** This study extends work on content-based classrooms in the Malaysian context. Its findings contribute to the ongoing work on improving instructional practices in the DLP classrooms.

**Keywords:** Classroom practices, dual language program, teachers' beliefs.

**Cite as:** Othman, J., Mohd Saat, R., Senom, F., & Hasan Adli, D. S. (2020). Dual language programme: Teachers' beliefs and practices in teaching Science through English. *Journal of Nusantara Studies*, 5(1), 255-269. <http://dx.doi.org/10.24200/jonus.vol5iss1pp255-269>

## 1.0 INTRODUCTION

Teachers are known to be as an important agent in an effective implementation of any educational reform. The recent reversal in language instruction policy in Malaysia through Dual Language Programme (DLP) necessitates a different thinking process about instructional practices from teachers who implement the principles of the current program in their classrooms. This change requires substantial adaptation of teachers' beliefs to align with the reform objectives.

DLP was implemented in 2016, aimed at producing students who are proficient in both English as well as the Malay language. The DLP provides option for students to choose the medium of instruction (either English or Malay) to teach the subjects taught at schools, such as Science and Mathematics. The decision to reintroduce English as a medium of instruction policy was triggered by various factors including the government's view that English competency is vital to the nation's economic and technological development, and the strong demands from parents who wanted their children to learn Mathematics and Science in English. They would like to ensure that their children are able to keep abreast with the scientific and technological development, which are mostly published in the English language.

Despite continuous efforts from the government to support the use of English as a medium of instruction, the initial introduction of DLP received mixed reactions from teachers as well as parents due to the previously flawed ETeMS (Teaching of Maths and Science in English) policy, which was implemented in 2003, and where the English language was adopted as the medium of instruction for Mathematics and Science in all national schools. It was implemented without much preparation, and caused various challenges to both Mathematics and Science teachers as well as the students. Past studies (Palmer, Martínez, Mateus, & Henderson, 2014; Othman & Mohd Saat, 2009) indicated that most teachers resorted to their own mother tongue in delivering the subject matter and minimally used English. Tan's (2011)

study revealed that teachers, especially in rural schools, face great challenges in teaching Mathematics and Science using the English language. The change did not only challenge the teachers who were educated in the Malay medium, but also those trained in English. This is due to the fact that their professional teaching experience have always been mainly involved with utilizing the Malay language as the medium of instruction. Furthermore, the Ministry of Education Malaysia (2015) reported that only 25 percent of Science and Mathematics teachers are proficient in English.

The Ministry of Education Malaysia (2015) also reported that achievement in the UPSR (Primary School Assessment Test), PMR (Lower Secondary Assessment), and SPM (Malaysian Certificate of Education) with English as a medium of instruction is much lower compared to that with Malay language, for both urban and rural schools. Hence, after six years of implementation, the MOE opted to abolish the ETeMS policy in 2009. The Ministry reverted to Malay as the medium of instruction in stages.

In contrast to the ETeMS policy, DLP is only implemented upon the school's request. The Ministry of Education Malaysia (2015) laid out four conditions that a school must fulfill in order to be eligible to implement DLP into practice. First, sufficient resources must be available. Second, approval from the principal and teachers are needed in order for DLP to take place. Third, the pre-determined requirements of DLP must be discussed into agreement through parents' support and requests. Fourth, the schools involved need to guarantee that the students' performance in the Malay language subject will be at least on par or better than the national average grade at the *Sijil Pelajaran Malaysia* (SPM) level.

In DLP, teachers of Mathematics and Science are required to assume a relevant set of beliefs and instructional practices that facilitate learners to acquire knowledge in the subject matter and develop both English and Malay language skills. Given the powerful influence of beliefs on teachers' instructional practices (Fang, 1996; Kagan, 1992; Pajares, 1992; Fives & Buehl, 2008), it is an important construct for the policy makers to investigate to what extent teachers' beliefs are implemented in the programme. The underlying idea behind most research on beliefs is that teachers' prior knowledge and life experiences strongly influence both the way they perceive of the teaching process and their instructional practices.

## **2.0 LITERATURE REVIEW**

A number of past research on teacher beliefs and knowledge has agreed upon a few characteristics of beliefs (Huttner, Dalton-Puffer, & Smit, 2013; Fives & Buehl, 2012; Pajares, 1992; Woolfolk Hoy, Davis, & Pape, 2006). Belief is viewed as a subset constructs that

designate, define, and describe the structure and content of mental states that are intended to drive the actions of a person. According to Borg (2001), the term ‘teacher beliefs’ generally refers to evaluative propositions, which teachers hold both consciously and unconsciously and accept as true while recognizing that others may hold alternative beliefs on the same subject. In addition, beliefs are filters that teachers employ as a guide for their classroom practices and curricular decisions. Hence, beliefs affect how, what and why teachers adopt a particular method of teaching, thus affecting the progress of the learners (Pajares, 1992).

The second characteristic revolves around the idea that teachers’ beliefs affect their professional development and instructional practices. According to Nespor (1987), beliefs are shaped by previous experiences, episodes, or cultural knowledge transmission sources. Tsai (2002) argues that the beliefs of teachers about how to teach Science and the way students learn Science may be linked to their own school experience. Likewise, Rath (2001) stated that the dissimilarities in teachers’ beliefs could be caused by their own experiences namely upbringing, life experiences, and their previous schooling experiences. Thus, in the sense of teachers’ beliefs, it can be assumed that the beliefs of teachers are hugely made up from their own experience in planning, decision making process and classroom behavior.

The third characteristic is the link between beliefs and knowledge. Pajares (1992) refers to the distinction between beliefs and knowledge by explaining that knowledge is based on objective facts, while beliefs are based on assessment and judgment. Supporting this view, Kagan (1992) argues that knowledge can be regarded as belief stated as true based on objective evidence or consensus of opinion. Mansour (2009) also agrees with Kagan (1992) that knowledge is dynamic while beliefs are more stable.

### ***2.1 Teachers’ Beliefs and Instructional Practices***

Pajares (1992) argues that teachers’ beliefs about teaching and learning are found to have an influence on their instructional practices. He further added that there is a strong link between pedagogical beliefs of teachers, their plans for teaching, teaching decisions and classroom practices. Correspondingly, Borg (2011) stated that teachers’ beliefs act as the foundation for action, whereby the beliefs influence and guide teachers’ decision making. Furthermore, past studies have proven that the beliefs and values of teachers concerning teaching and learning will have an impact on their teaching practices (Kagan, 1992; Fives & Buehl, 2016).

Numerous studies reported that teachers’ beliefs influence lesson planning and classroom instructional activities (Borg, 2006; Basturkmen, 2012; Sato & Kleinsasser, 2004; Sullivan & Woods, 2008). Moreover, a study by Tan (2011) showed that teachers’ belief in

their respective roles as only content teachers or language teachers limits their learners' language learning opportunities. The findings reveal the lack of collaboration between content and language teachers and the need for continued professional development with regard to content and language integration for both teacher groups. As Olson (2007) points out, instruction of languages in schools are highly influenced by language policies. Thus, any types of medium of instruction reforms would be ineffective without the teachers' preparedness towards the policies.

On the other hand, an equal number of research suggests that the beliefs of teachers do not correspond to their practices (Buehl & Beck, 2015; Lee, Baik, & Charlesworth, 2006; Stipek & Byler, 1997). The link between the beliefs and practices of teachers is rather complex as it is influenced by various factors including teachers' experience, knowledge and their school culture. These factors contribute to the convergence or divergence of their beliefs and practices. Borg (2003) argued that contextual constraints might prevent teachers from implementing their beliefs.

As DLP is a national agenda, it is crucial that teachers play an important role to ensure successful implementation of the policy. Although past research (Mansour, 2009; Levitt, 2001) has suggested that the instructional practice of Science teachers is influenced by their beliefs, there is still a need to look at teachers' beliefs to shed light on their classroom activities. Thus, in order to understand the task at hand, it is important for us to examine the beliefs these teachers have towards the implementation and practices in the Dual Language Program.

This study aimed at addressing the associations between beliefs and practices, which a group of Science teachers in Malaysia employs in their classrooms to meet English language needs. In this study, we argue that Science teachers' beliefs greatly influence their instructional practices (Mansour, 2009; Levitt, 2001). Hence, studying teachers' beliefs is vital and the study aims to: 1). examine the primary science teachers' beliefs about teaching science through English as a teaching medium 2). find out whether the beliefs of science teachers are consistent with their instructional practices.

### **3.0 METHODOLOGY**

This study sought to ascertain the beliefs and practices of primary school teachers teaching Science through the medium of English language. In doing so, we adopted a quantitative approach in analyzing the data collected from survey questionnaires. The respondents of this study consisted of 44 science teachers. 34 were female respondents and ten were male. Their age ranged from 24 to 49. In terms of teaching experience in Science, the number of years

ranged from two to more than eleven years. All of them had their education in the Malay medium of instruction.

A questionnaire was used to elicit Science teachers' beliefs and practices. It is established that beliefs cannot be observed directly, however, what people say, intend and do, can be inferred (Pajares, 1992). Thus, evidence of beliefs and practices can be elicited through belief statements or their behavior. The questionnaire comprised items, which obtained demographic data about teachers' biographical and professional backgrounds, as well as items on their beliefs and practices. This is consistent with the purpose of the study that examined the beliefs and practices of teachers in dealing with teaching their subject matter in English as a second language. Science teachers were asked to complete a questionnaire on their beliefs and practices concerning Science teaching through English. The survey measured the strength of their agreement with 18 statements related to beliefs which were rated on a scale of 4 points Likert (1= Strongly Disagree to 4= Strongly Agree) and the frequency of occurrence of 18 classroom practices statement (1= Never to 4=Very Often). These items are consistent with instructional practices that support teaching Science using the English language. The scale based on these 36 items was found to be reliable (Cronbach's  $\alpha = 0.80$ ).

The questionnaire was specifically designed for this study. All the items were built based on researchers' experience as science and language teachers and relevant literature. Due to its novelty, the questionnaire was subjected to a pilot testing procedure. Following this procedure, amendments were made to the questionnaire. A reliability analysis yielded a Cronbach's of 0.80 for the questionnaire items. The survey was distributed via google forms.

#### **4.0 ANALYSIS AND DISCUSSION**

Findings from the questionnaire on the Science teachers' beliefs concerning teaching of Science through English medium are presented in Table 1. The results were obtained from the Likert-style items on a scale from 1 to 4 (1=strongly disagree and 4= strongly agree). Means and standard deviation of all variables are reported in Table 1.

Table 1: Descriptive statistics of teachers' beliefs

	<b>Items</b>	<b>Mean</b>	<b>Std Dev</b>
1.	DLP teachers require a lot of administrative support.	3.66	.568
2	DLP teachers require supplementary resources.	3.55	.589
3	DLP teachers require cooperation with English language teachers.	3.55	.589
4	I think teacher-student interaction is important in my DLP class.	3.50	.550
5	DLP teachers require both subject knowledge and English language proficiency.	3.45	.663
6	DLP teachers require a lot of time (both lesson planning and teaching).	3.27	.585
7	As a Science teacher, focusing on both language form and content in DLP class is challenging.	3.23	.803
8	It is necessary to use Malay as well as English for maximizing students' learning of English in the primary school DLP class.	3.20	.554
9	I think providing comprehensible input is crucial.	3.14	.746
10	I think learning Science in English is cognitively demanding for my students.	3.05	1.04
11	It was a correct decision to start DLP in primary school.	2.93	.813
12	My experience in teaching Science through English has been positive.	2.89	.955
13	DLP helps students develop both their language skills and subject knowledge.	2.86	.582
14	I know how to provide comprehensible input in DLP class.	2.82	.788
15	I think my students understand English that is used in Science class well.	2.73	.914
16	DLP helps students develop only their language skills.	2.66	.810
17	I think my students have no problem in understanding the content of Science in English lessons well.	2.64	.813

18	Primary school students learn English best when Science class is entirely conducted in English.	2.61	1.02
----	---	------	------

\*Value based on 4-point Likert scale: 1= *Strongly Disagree* 2= *Disagree* 3= *Agree* 4= *Strongly agree*

Table 1 displayed the mean and frequency of the Science teachers' beliefs regarding dual language program (DLP). Analysis of the data showed that most of the respondents believed that they need a lot of administrative support (m=3.66). On average, they also reported that they require supplementary resources (m=3.55) and cooperation from English language teachers (m=3.55). The Science teachers in the survey also believed that teacher-student interaction (m=3.55) is important in Science class and that they require both subject knowledge and English language proficiency (m=3.45).

In terms of planning and teaching Science lessons, they stated that it requires a lot of time (m=3.27). They agreed that focusing on both language form and content is challenging (m=3.23). On average, the Science teachers tended to believe that it is necessary to use Malay as well as English to maximize their learning (m=3.20) and important to provide comprehensible input in learning Science using the English language (m=3.14). This is due to the fact that they believed learning science in English is cognitively demanding for the students.

Three items, which received the lowest scores in this construct, are related to English language skills. The Science teachers rated 'DLP helps students develop only their language skills' (m=2.66) and 'think their students have no problem in understanding the content of Science in English lessons well' (m=2.64). The teachers rated the statement 'primary school students learn English best when Science class is entirely conducted in English' lowest (m=2.61).

The results for research question one concerning teachers' beliefs about teaching Science through English indicate that their main focus in the classroom is on teaching subject matter. This finding corroborates with Tan's (2011) study.



Table 2: Descriptive statistics of teachers' practices

<b>Items</b>	<b>Mean</b>	<b>Std Dev</b>
1. Prescribed textbooks by the Ministry of Education	3.59	.658
2. Textbooks related to scientific English	3.43	.661
3. Present information through various modalities (i.e., auditory and visual).	3.36	.487
4. Teach science concepts	3.34	.608
5. Use both Bahasa Malaysia and English during classroom talk.	3.30	.734
6. Consult the Science teachers in my school on matters relating to teaching science in English	3.20	.668
7. Use reference materials such as dictionary and grammar books to help me with the English language.	3.14	.702
8. Use varied supplementary materials to increase chances of reaching all students.	3.07	.501
9. Prepare materials myself	3.05	.680
10. Vocabulary items related to Science	3.02	.849
11. Translate from English to Bahasa Malaysia frequently while teaching Science.	2.98	.698
12. Use supplementary textbooks	2.93	.759
13. Use Science dictionary frequently to get the right scientific terminologies.	2.89	.618
14. Teach vocabulary items related to scientific English	2.84	.776
15. Attend workshops /courses related to Science in English.	2.77	.774
16. Vocabulary items related to general English	2.64	.750
17. Use bilingual dictionary	2.48	.821
18. Teach grammatical structures related to Science.	2.36	.613

*Scale: 1= Never 2= Sometimes 3= Often 4= Very Often*

Table 2 provides the descriptive statistics for Science teachers in DLP classroom practices. On a scale from 1 to 4 (1= never and 4= very often), results indicated that the top three scoring means were using prescribed textbooks by the Ministry of Education (m=3.59), followed by textbooks related to scientific English (m=3.43) and presenting information through various modalities (m=3.36). These findings seem to indicate that having adequate resources are crucial

to the science teachers in teaching science through the medium of English. As Hudson (2009) rightly points out, science teachers around the world are acknowledged as the key to reforming science education. They need time, resources and support for continuous professional development to encourage better learning outcomes.

The other two items that scored high focus on science concepts ( $m=3.34$ ) and using both Bahasa Malaysia and English during classroom talk ( $m=3.30$ ). As Wellington and Osborne (1998) point out, the primary skills for science teachers are not their ability to do science or to show learners how to do science, but their ability to interpret and convey a complex and fascinating subject. According to them, one of the fundamental skills of teaching is the ability to explain the ideas of science to their learners. This finding concurs with Probyn's (2001) results that the process of teaching and learning through the medium of a second language is challenging for the teachers. Although teachers appear to react positively to the use of English as a teaching medium to teach science, data from this study suggests that, the language of the classroom is very often a mixture of English and Malay.

The three least scoring items in this construct focus on 'vocabulary items related to general English' ( $m=2.64$ ), using bilingual dictionary ( $m=2.48$ ), and grammatical structures related to science ( $m= 2.36$ ).

Table 3: Correlation between teachers' beliefs and classroom practices

	<i>Beliefs</i>	<i>Practices</i>	<i>Years of teaching</i>
<i>Beliefs</i>	1	0.157	- 0.129
<i>Practices</i>	0.157	1	

\* $p < 0.05$

A Pearson correlation analysis was computed to examine association between the teacher belief scales and the ratings of classroom practices. Table 3 shows that there was no significant relationship between teachers' beliefs and their stated practices ( $r= 0.157$ ,  $p< 0.05$ ). This finding seems to imply that the primary science teachers' beliefs are not congruent with their instructional practices in teaching Science using the English language.

The apparent lack of convergence between the beliefs and practices of Science teachers can be attributed to the fact that teachers may express beliefs they do not hold. Another possible reason for the mismatch between teachers' beliefs and their practices could be due to contextual constraints such as time factors and examination pressures (Tan, 2011). Methodological

problems may also lead to a lack of consensus between beliefs and practices. As a small sample of Science teachers was involved in this study, these findings should be carefully interpreted and checked for future research.

## **5.0 CONCLUSION**

The aim of this study was to examine the relationship between Science teachers' beliefs and instructional practices. The results from the quantitative data analysis suggest that in teaching Science using the English language, the beliefs of the primary school teachers were not always aligned with their stated practices with regard to DLP. The inconsistency between the beliefs of Science teachers' and their instructional practices is not unexpected. Buehl and Beck (2015) pointed out previous research (Lee et al., 2006; Stipek & Byler, 1997) has shown mixed results with regard to relationship between the beliefs of teachers and their classroom practices.

The link between beliefs and practices is not that direct and simple. It is influenced by various contextual factors such as time, examination pressures, lack of training, resources and effective support mechanism (Tan, 2011; Song & Samimy, 2015). The results of our study could be influenced by the contextual limitations which could influence the implementation of teachers' beliefs. Effective implementation of an educational reform requires sufficient training and effective support mechanisms to be provided for teachers who need help. The primary science teachers reported that they need a lot of support and supplementary resources in teaching Science using the English language. Teachers indicated that they received little training on DLP as compared to ETeMS (Unting & Yamat, 2017). Furthermore, Fives and Buehl (2012) argue that school administrators should recognize specific restrictions that may impede their beliefs and work to alleviate them. Teachers need time, resources, continuous professional support and collaboration. Park and Pawan (2016) assert that change in the beliefs of teachers and programs, which support teachers as they gradually adapt to the changes brought about by the policymakers, should facilitate their practices.

The primary science teachers have a difficult task to teach science through the medium of English. They have to be well-versed with the language of science in order to convey the content and ensure that the learners understand the concepts. This could be made easier when the teacher is familiar with the medium of instruction in which science is being taught, as the teacher would then have to focus mainly on one aspect, that is, the language of science (Othman & Mohd Saat, 2009). However, if the teachers were not proficient in the medium of instruction, this task would prove even more challenging as the teacher would have to focus on two aspects, which are, being familiar with the language of instruction as well as the language of science.

The use of English as a medium of instruction can be difficult and challenging to some of the teachers as they themselves are groping with the English language.

Assuming that beliefs influence practices, the beliefs of primary science teachers may need to be changed to achieve DLP goals. Promoting beliefs change is an important and difficult task for policy makers, as beliefs are often deep and inflexible. In order to facilitate the development of science teachers' beliefs, policy makers should provide clear guidelines that reflect the objectives of DLP program and take into account of the realities of the teaching content. However, as Fives and Buehl (2016) argue that changing teacher beliefs require time and attention for their whole belief system. Professional development to support new policies must explicitly assist teachers in developing their beliefs in line with their intended practices. It must involve programs which help teachers to improve their language competency and skills in integrating content. As Stipek, Givvin, Slamon, and MacGyvers (2001) argue whatever method is employed, it is obvious that beliefs and practices are connected and the emphasis on the professional development of teachers is likely to fail without considering both factors.

Thus, these findings imply that primary science teachers cannot be solely responsible for the inconsistencies between their beliefs and practices. School administrators and the relevant stakeholders could provide professional development trainings, support and help teachers find ways to cope with contextual limitations.

### **Acknowledgment**

This research work is funded by the Fundamental Research Grant Scheme (FRGS), grant number: FP034-2016.

### **REFERENCES**

- Basturkmen, H. (2012). Review of research into the correspondence between language teachers' stated beliefs and practices. *System*, 40(2), 282–295.
- Borg, M. (2001). Teachers' beliefs. *English Language Teaching Journal*, 55(2), 186-187.
- Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching*, 36(2), 81-109.
- Borg, S. (2006). *Teacher cognition and language education: Research and practice*. London: Continuum.
- Borg, S. (2011). The impact of in-service teacher education on language teachers' beliefs. *System*, 39(3), 370-380.

- Buehl, M. M., & Beck, J. S. (2015). The relationship between teachers' beliefs and teachers' practices. In H. Fives, & M. G. Gill (Eds.), *International handbook of research on teachers' beliefs* (pp. 66-84). New York: Routledge.
- Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, 38(1), 47-65.
- Fives, H., & Buehl, M. M. (2008). What do teachers believe? Developing a framework for examining beliefs about teachers' knowledge and ability. *Contemporary Educational Psychology*, 33(1), 134-176.
- Fives, H., & Buehl, M. M. (2012). Spring cleaning for the “messy” construct of teachers' beliefs: What are they? Which have been examined? What can they tell us? In K. R. Harris, S. Graham, & T. Urdan (Eds.), *Individual differences and cultural and contextual factors: Vol. 2. APA educational psychology handbook* (pp. 471-499) Washington, DC: American Psychological Association.
- Fives, H., & Buehl, M. M. (2016). Teachers' beliefs, in the context of policy reform. *Policy Insights from the Behavioural and Brain Sciences*, 3(1), 114–121.
- Hudson, P. (2009). Learning to teach science using English as the medium of instruction. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(2), 165–170.
- Huttner, J., Dalton-Puffer, C., & Smit, U. (2013). The power of beliefs: Lay theories and their influence on the implementation of CLIL programmes. *International Journal of Bilingual Education and Bilingualism*, 16(3) 267-284.
- Kagan, D. M. (1992). Implications of research on teacher belief. *Educational Psychologist*, 27(1), 65-90.
- Lee, Y., Baik, J., & Charlesworth, R. (2006). Differential effects of kindergarten teachers' beliefs about developmentally appropriate practice on their use of scaffolding following in service training. *Teaching and Teacher Education*, 2(7), 935–945.
- Levitt, K. E. (2001). An analysis of elementary teachers' beliefs regarding the teaching and learning of science. *Science Education*, 86(1), 1-22.
- Mansour, N. (2009). Science teachers' beliefs and practices: Issues, implications and research agenda. *International Journal of Environmental and Science Education*, 4(1), 25-48.
- Ministry of Education Malaysia. (2015). Surat siaran kementerian pendidikan Malaysia bilangan 18 tahun 2015 – Pelaksanaan rintis program dwibahasa atau dual language

- programme (DLP) di sekolah pada tahun 2016. Retrieved from <http://www.moe.gov.my/en/suratsiaran-view?id=1087&>, 2015.
- Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, 19(4), 317-28.
- Olson, K. (2007). Lost opportunities to learn: The effect of education policy on primary language instruction for English learners. *Lingui Education*, 18(1), 121-141.
- Othman, J., & Mohd Saat, R. (2009). Challenges of using English as a medium of instruction: Preservice Science teachers' perspective. *Asia Pacific Education Researcher*, 18(2), 307-316.
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.
- Palmer, D. K., Martínez, R. A., Mateus, S. G., & Henderson, K. (2014). Reframing the debate on language separation: Toward a vision for translanguaging pedagogies in the dual language classroom. *The Modern Language Journal*, 98(3), 757-772.
- Park, J., & Pawan, F. (2016). Korean professors' pedagogical efforts and professional development needs in english-medium instruction. In J. Crandall & M.A. Christison (Eds.), *Teacher education and professional development in TESOL* (pp. 191-203). New York: Routledge.
- Probyn, M. J. (2001). Teachers' voices: Teachers' reflections on learning and teaching through the medium of English as a second language. *International Journal of Bilingual Education and Bilingualism*, 4(4), 249-266.
- Raths, J. (2001). Teachers' beliefs and teaching beliefs. *Early Childhood Research and Practice*, 3(1), 1-11.
- Sato, K., & Kleinsasser, R. C. (2004). Beliefs, practices, and interactions of teachers in a Japanese high school English department. *Teaching and Teacher Education*, 20(8), 797-816.
- Song, S., & Samimy, K. (2015). The beliefs of secondary content teachers of English language learners regarding language learning and teaching. *International Journal of TESOL and Learning*, 4(1), 3-19.
- Stipek, D. J., Givvin, K. B., Salmon, J. M., & MacGyvers, V. L. (2001). Teachers beliefs and practices related to mathematics instruction. *Teaching and Teacher Education*, 17(1), 213-226.
- Stipek, D. J., & Byler, P. (1997). Early childhood education teachers: Do they practice what they preach? *Early Childhood Research Quarterly*, 12(3), 305-325.

- Sullivan, P., & Wood, T. (2008). *The handbook of Mathematics teacher education: Knowledge and beliefs in Mathematics teaching and teaching development*. Boston, MA: Sense Publishers.
- Tan, M. (2011). Mathematics and Science teachers' beliefs and practices regarding the teaching of language in content learning. *Language Teaching Research*, 15(3), 325-342.
- Tsai, C. (2002). Nested epistemologies: Science teachers' beliefs of teaching, learning and science. *International Journal of Science Education*, 24(8), 771-783.
- Unting, J. G., & Yamat, H. (2017). Dual language Programme (DLP): Teachers' voice. In *Proceedings of 73rd ISERD International Conference, Bali, 13-14 May* (pp. 20–24). Retrieved from [http://www.worldresearchlibrary.org/up\\_proc/pdf/841-149992668820-24.pdf](http://www.worldresearchlibrary.org/up_proc/pdf/841-149992668820-24.pdf)
- Wellington, J., & Osborne, J. (2001). *Language and literacy in science education*. Philadelphia, PA: Open University Press.
- Woolfolk Hoy, A., Davis, H., & Pape, S. J. (2006). Teacher knowledge and beliefs. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.