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TACIT KNOWLEDGE IN INSTRUCTIONAL LEADERSHIP: EVIDENCE FROM MALAYSIAN SECONDARY PRINCIPALS

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ABSTRACT

Although there is a plethora of studies related to principals' instructional leadership practice, little attempt has been made to understand their tacit knowledge in this area. Thus, the key purpose of this study is to understand whether Malaysian principals have in-depth knowledge on instructional leadership practice as it is highly emphasised in the Malaysia's Education Blueprint policy. A total of 202 secondary principals have provided their feedback on their tacit knowledge related to instructional leadership practice. Later, their answers were compared with suggestions from instructional leadership models to see if they coincided. In measuring secondary principals' tacit knowledge, results indicated that secondary principals have in-depth knowledge on instructional leadership as they achieved a score of over 80 per cent correct answers for 13 out of 15 items to which they were asked to respond. In terms of significant differences, the non-parametric results indicated that there are differences in terms of their experiences in practising instructional leadership. The significant differences were indicated between senior with novice principals with a non-significant difference from principals' gender and age. Finally, this indicates that principals' tacit knowledge on instructional leadership was influenced by their leadership experience and age. There are suggestions and recommendations concerning the practical implications of principals' benefitting from practising instructional leadership.

Keywords: Secondary Principals, Demographics, Tacit Knowledge, Instructional Leadership

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INTRODUCTION

It is an accepted fact that school principals have a pivotal role in determining a school's learning environment and effectiveness (Skaalvik, 2020). As a school leader, they must practise instructional leadership to improve the school's academic performance (Hallinger & Hosseingholizadeh, 2020; Ng, 2019). In realising the significant influence of instructional leadership on students' academic performance, Malaysia's Ministry of Education has ensured that all principals need to practise instructional leadership as its main initiative to improve students' academic achievement (Ministry of Education, 2013). The main reason for the mandate policy is to strengthen instructional leadership practice in schools with the purpose of improving school's academic performance, enhancing their instructional delivery system, improving their management and administration and, lastly, ensuring that principals have the skills needed to improve teaching and learning quality (Ministry of Education, 2017). To strengthen principals' knowledge of instructional leadership, the Ministry also provided them with continuous professional development programmes (Ministry of Education, 2013) as part of their leadership preparation programme organised by the Institut Aminuddin Baki, the Ministry of Education, Malaysia.

A few years ago, empirical research in school leadership explored the management of explicit and tacit knowledge (Petrides and Nordine, 2003) in a school context. As pointed out by Ruff and Shoho (2005), the topic of managing explicit and tacit knowledge is very much related to the cognitive studies in education administration which focus on principals' beliefs, values and problem-solving skills. In leading the school's instructional tasks, Stemler *et al.* (2006) affirmed that effective practice stems from past knowledge and experiences that guide effective decision-making related to solving instructional issues. For Lazaridou (2009), tacit knowledge in school leadership is defined as second-order knowledge that controls how the context-specific knowledge and skills should be improved and applied within the school setting. In school leadership practice, principals' tacit knowledge on how to lead their schools is considered to be significant since they have to face tasks that are demanding and complex (Wassink, Slegers & Imants, 2003) when solving school problems. This is because principals are frequently having problems or experiencing difficulties in solving the school's issues which sometimes put them at risk (DeLuca *et al.*, 1997). In fact, in pointing out the importance of tacit knowledge, Dimmock (2016) noted that school leaders generally learned to lead based on their on-the-job experience and through sharing experiences with their colleagues rather than by attending courses and reading books.

Another explanation was provided by Kim (1993) who designated tacit knowledge as a mental model exploration which originated from experiential learning or experiences, and which encompassed observation, assessment, design and implementation. As such, tacit knowledge is considered essential when solving problems and issues and making effective decisions (Lester, 1995). In explaining the concept of tacit knowledge, Garcia (2017) has provided a clear definition of tacit knowledge as an individual's unique practical knowledge, skills and expertise which are difficult to replicate and codify. Hart (1993) describes tacit knowledge as the knowledge obtained by principals related to their schools and their own social networking processes. For Cooper and Heck (1995), tacit knowledge is related to an individual school leader's personal values that guide effective decision-making for his/her school. Wassink *et al.* (2003) also defined tacit knowledge as a type of practical knowledge about how things work grounded on school leaders' past experiences. In addition, Wasonga and Murphy (2006) described tacit knowledge as being neither visible nor expressible. This is because this type of knowledge is embedded in someone's actions, experiences, ideas and values. Accordingly, they believed that tacit knowledge was experienced through social interactions and in collaboration with other parties within shared social, school and cultural contexts.

The significant reason for seeking to understand school leaders' tacit knowledge is much related to their strategic approach in coping with the complex daily routines which lead to effective leadership practices (Wassink, Slegers & Imants, 2002). In addition, Leithwood *et al.* (1990) argued that studying principals' tacit knowledge provides an understanding of their beliefs and values that guide their effective practices in leading. In terms of school instructional tasks, tacit knowledge is considered significant because it was widely employed to solve a school's instructional problems, and effective decision-making related to a school's instructional tasks and activities (Ruff &



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Shoho, 2005). Accordingly, studying principals' tacit knowledge provides an understanding of their problem-solving capabilities which have the potential to improve school performance and its capacity to become/remain effective (Sarason, 2002; Ruff & Shoho, 2005). As such, Argris (1999) argues that organisations need to incorporate tacit knowledge as a major resource for stimulating organisational achievement. Thus, organisational leaders must employ tacit knowledge as a guide for achieving organisational objectives since it reflects previous experiences that have worked within the organisational context.

Despite explaining the benefit of tacit knowledge towards organisational effectiveness, Stokvik, Adriaenssen and Johannessen (2016) revealed that research in cognitive studies, and specifically tacit knowledge, has received little attention from researchers although it is considered as a research element at the forefront of learning and innovation. In the context of school leadership, the element of tacit knowledge is considered as essential, nonetheless, there is still a wide gap in the literature on educational administration and leadership (Ruff & Shoho, 2005; Nestor-Baker & Hoy, 2001; St Germain, 2003) compared to other professions. In fact, it is pointed out that there is a little research and few studies on principals' strategic and practical knowledge of leadership related to how they think and the approaches they use in problem-solving (Leithwood & Steinbach, 1992; Hallinger *et al.*, 1993; Lazaridou, 2009). According to St Germain (2003), in an era with a shortage of candidates for principalships, it seems critical to understand the effects of tacit knowledge upon principals' job performance.

Similarly, in Malaysia, the topic of tacit knowledge in instructional leadership remains in its infancy due to a lack of attention from local researchers. After the launch of the Malaysian Education Blueprint (MEB) in 2013, it is mandatory for Malaysian principals to incorporate instructional leadership within their leadership practice (Harris *et al.*, 2019). In this sense, while practising instructional leadership, principals frequently employed their tacit knowledge, which encompassed their past knowledge and experiences, when making decisions and solving their school's current instructional problems. Thus, as school leaders, the use of tacit knowledge while leading their schools is considered as a necessity in helping principals to solve complex and demanding school issues and problems (Ruff & Shoho, 2005). Comparatively, in other sectors, the topic of tacit knowledge remains an interesting topic to be explored within the scope of organisational leadership. For instance, a study by Abdul Manaf *et al.* (2020) revealed that public sector leaders categorised as experts and who have wide tacit knowledge were seen as proactive leaders who actively display their knowledge in their positive personality traits such as conscientiousness and openness. In addition, as senior public sector leaders, they were found to practise many positive behaviours such as thoroughness, responsibility and persistence which developed competencies and success.

In this study, we investigated the use of tacit knowledge by secondary principals when practising instructional leadership. Tacit knowledge in this study is being operationalised as principals' past experiences, practical knowledge, values, preferences and skills in the practice of instructional leadership. As for principals in Malaysian schools, before being appointed as school principals, they were being exposed to the concepts and models of instructional leadership in their leadership preparation programmes such as the National Professional Qualification for Educational Leaders (NPQEL) or National Professional Qualification for Headship (NPQH) organised by the Institut Aminuddin Baki, Ministry of Education. Therefore, this study has three main queries in filling the gap and supplementing the literature related to principals' tacit knowledge of instructional leadership specifically within the public secondary school context. This study tries to identify tacit knowledge on instructional leadership obtained by secondary principals by addressing three pertinent research questions:

- a. Do secondary principals obtain sufficient tacit knowledge in instructional leadership?
- b. Are there any differences related to secondary principals' demographics in terms of their tacit knowledge of instructional leadership?
- c. Do secondary principals' demographics predict their tacit knowledge of instructional leadership?

It is expected that discoveries of this study will document clear indications of secondary principals' tacit knowledge of instructional leadership and identify the suitability and benefit of tacit knowledge being employed by Malaysian secondary principals in solving a school's instructional issues and making decisions related to instructional practices.



LITERATURE REVIEW

Tacit knowledge

In conceptualising the elements of tacit knowledge, Polanyi (1958) defined it as knowledge that is embedded in a person and which can be seen when a person performs an action, commitment and/or specific involvement. Moreover, transferring tacit knowledge to another person must involve active and creative processes. In this case, the person who acts as the receiver needs to understand the transmitted knowledge (Cannon, 2002) and later incorporate it within their existing knowledgebase (Stokvik *et al.*, 2016; Kim, 1993). Accordingly, this type of knowledge cannot be learned through formalised and codified procedures unless it becomes explicit knowledge. This type of knowledge is highly applicable in some professions such as medicine, teaching, management and research (Stokvik *et al.*, 2016). In this sense, Nonaka and Takeuchi (1995) conceptualised tacit knowledge into two major dimensions: technical and cognitive. The technical dimension encompasses the informal skills or crafts based on the concept of 'know-how' whilst the cognitive dimension consists of mental models, schemata, beliefs and perceptions.

Later, Nestor-Baker and Hoy (2001) defined tacit knowledge as a specific type of reasoning skills employed to achieve objectives and goals. Indeed, tacit knowledge has been variously described as knowledge related to practicality (Gardner, 1999), on-the-job (task) knowledge (Wagner & Carter, 1996), or practical knowledge based on individual past experiences (Meijer *et al.*, 1999). According to Schön (1983), tacit knowledge is considered as undeclared and hidden within the thinking process of a person. Likewise, Alwis and Hartmann (2008) also believed that tacit knowledge is considered as personal and hard-to-interpret and as stemming from procedures, commitment to values and emotions. In this sense, the description of tacit knowledge by Steinberg *et al.* (1993) is related to everyday knowledge about what does and does not work, which is useful for everyday management practices. In summary, tacit knowledge is defined as knowledge that was created from informal and experiential learning, even personal experiences, which is difficult to codify and record (Santo, 2005 Nonaka *et al.*, 2001). In this sense, Noe (2013) conceptualised tacit knowledge as personal knowledge derived from someone's experiences and which is difficult to share. Similarly, Ozmen (2010) defined tacit knowledge as knowledge obtained from experiences, intuitions, insights and someone's personal judgement but which is quite difficult to capture and codify. For Janson and McQueen (2007), individual tacit knowledge is obtained from motivation, exposure, opportunity and environment which is later reinforced and expanded based on trial-and-error experiences and personal reflections.

Previous researchers studying leaders' or individuals' tacit knowledge stressed that tacit knowledge is considered as personal knowledge which belonged to an individual (Chen *et al.*, 2018; Agyemang & Boateng, 2019; Zebal, Ferdous & Chambers, 2019). Accordingly, they believe that tacit knowledge is derived from someone's personal experiences which include their values, idealism and preferences (Kawamura, 2016; Hartley, 2018; Asbari *et al.*, 2019). According to Grigorenko *et al.* (2006), tacit knowledge is considered as a leader's capacity for adapting, choosing and designing their organisational settings. The element of tacit knowledge is defined as an informal learning process from an individual's past experiences that is being employed for completing a given task. In this sense, Huang *et al.* (2010) mentioned that the benefits of tacit knowledge for organisational leaders are to create a current strategic vision in order to compete, create organisational innovation and solve most of an organisation's problems and issues. Furthermore, Nelson and Winter (1982) believed that to lead organisations towards effectiveness, leaders must acquire tacit knowledge on how to lead the organisation since tacit knowledge emphasises the elements that cannot be explained by explicit knowledge. As mentioned by Ozmen (2010), tacit knowledge is an asset and considered vital to ensure organisational sustainability.

Empirically, there is still little research related to tacit knowledge within the context of management and leadership in education; within a school-based or higher education context. In measuring the loss of tacit knowledge in higher education, Garcia (2017) found that higher education is currently facing issues related to loss of tacit knowledge arising from employee turnover and the half-hearted application of knowledge management processes and



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strategies. Through a qualitative study in a public university, Garcia (2017) found that tacit knowledge is highly influencing the quality of services provided by the studied university. In addition, tacit knowledge also played a significant role related to non-academics' learning. Nevertheless, it was reported that challenges related to tacit knowledge are linked to a lack of procedures for preserving tacit knowledge. In addition, the factors that support tacit knowledge retention in higher education are communication and trust, effective communication, leadership and culture.

Instructional Leadership

According to Leithwood and Duke (1998), teachers' instructional leadership can be defined as how they engage in activities that enhance students' learning and growth. Recently, the model of instructional leadership was considered as the most studied within the school leadership framework based on its purpose of improving and enhancing a school's academic performance (Zhao, 2018; Zheng *et al.*, 2017). The prevalent model of instructional leadership was introduced by Hallinger and Murphy in 1985 to investigate principals' capacities for enhancing a school's academic performance through instructional approaches such as supervision, setting the school's vision and mission, staff development and teachers' collaborative and sharing culture in school (Hallinger, 2016; Hou, Cui & Zhang, 2019; Hallinger & Hosseingholizadeh, 2020). Based on recent findings on instructional leadership, Ng (2019) added that through instructional leadership practice, a conducive and favourable school climate is created, and instructional arrangements formed to achieve quality teaching and learning practices. Previous literature has pointed out the significant role of instructional leadership as the most noticeable determinant for a school's academic improvement (Day *et al.*, 2016; Harris *et al.*, 2019).

In the earlier model, Hallinger and Murphy (1985) proposed three (reduced from five) pertinent constructs they strongly believed capable of improving a schools' academic performance (Robinson *et al.*, 2008). The three constructs define the school's mission and vision, manage the instructional programmes and, lastly, promote a positive school-learning climate (Hallinger & Wang, 2015; Hallinger *et al.*, 2015). In this sense, the role of an effective instructional leader is just to ensure the smooth operation of a school's instructional practice, whilst also providing on-going and continuous professional development aimed to escalate teachers' competencies in teaching and learning (Hallinger & Murphy, 2013; Harris *et al.*, 2017).

Despite the critics of instructional leadership which acknowledges principals as the centre of expertise in determining a school's performance (Hallinger, 2003) with too much focus on teaching and learning activities (Bush, 2013), the practice of instructional leadership is considered mandatory for all principals in Malaysian schools alongside distributed leadership (Ministry of Education, 2013). To achieve the MEB's policy aspirations, the Malaysian Ministry of Education has emphasised that all schools in Malaysia will be led by high-performing school leaders who will emphasise instructional leadership practice and not simply 'administrative leadership' (Ng, 2017; Adams, Ng & Muniady, 2020). This is because the instructional leadership practice was formally accepted as leadership practice that contributed to creating a better school able to enhance students' performance (Harris *et al.*, 2017). In fact, the instructional leadership practice was also being emphasised by other education system policymakers in their pursuit of educational betterment (Harris & Jones, 2015). In 2017, Harris *et al.* (2017) proved that Malaysian principals have adequate understanding of their responsibilities and roles in practising and improving instructional practice. From interviews, principals illustrated the ways in which teachers were monitored and supervised to ensure high-quality teaching and learning. They clearly show that principals in Malaysia are familiar with and understand the congruence of theory and practice related to instructional matters.

In addition, principals are required to provide their support and encouragement for teachers' experimental innovations and new ideas to improve the quality of school instructional routines (Keamy, 2016). In arguing the role of principals as effective instructional leaders, Guglielmin (2020) claimed that principals are the significant school leaders who can ensure instructional leadership practice in schools. As principals, they need to support teachers in always experimenting with new methods of teaching and learning, monitoring the quality of teachers' instructional



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practices and providing on-going training for teachers to excel in their instructional practices. In addition, Salo *et al.* (2015) stressed the role of principals in providing backing and encouragement for teachers with new ideas, strategies and approaches for solving students' learning issues and problems. Further, principals are expected to have frequent conversations with teachers as part of their mutual inquiries related to instructional practices in classrooms.

Tacit knowledge and school leadership

Admittedly, although it was first addressed in the early of 1990's, little is known about school leaders' tacit knowledge (Dimmock, 2012). In arguing this gap, Leithwood (1998) and Leithwood and Steinbach (1995) wrote that the link between school leaders' cognitive or mental processes and their practices as school leaders has been signposted as a neglected area of inquiry since it is vital to understand principals' thinking and how they frame their problems and solutions.

In understanding school leaders' tacit knowledge, Nestor-Baker and Hoy (2001) attempted to relate the tacit knowledge acquired by school superintendents with their individual successes. In Malaysia, Aziz and Abdul Rahman (2014) have examined the use of tacit knowledge by primary principals based on three major skills: cognitive, social and technical. The feedback from 370 primary principals discovered that primary principals frequently used tacit knowledge strongly related to their social, rather than technical and cognitive, skills in order to solve problems and issues related to social interaction with parents and the school community. In addition, the study also indicated that tacit knowledge was a strong factor (35.9%) of influencing the practice of school innovation. Based on this result, tacit knowledge was acknowledged as the type of knowledge most frequently used by primary principals when supporting innovation in schools.

Also, there are notable studies that have explored the cognitive elements of tacit knowledge amongst school leaders when attempting to measure the substantial differences between senior and novice principals. They have provided proven evidence that these differences involve the tacit knowledge of the two groups (Leithwood & Rosenbach, 1992; Ruff & Shoho, 2005; Leithwood & Stager, 1989). In 1989, Leithwood and Stager tried to compare the problem-solving skills of novice and senior elementary principals. A total of 22 elementary principals were interviewed in several phases. In the first phase, principals were given a problem-sorting task which involved ranking problems based on their priorities. Next, principals were required to suggest some solutions to the problems. The results showed little differentiation between novice and senior elementary principals in identifying problems. However, there were small differences in solving problems based on their different levels of experience with senior principals having faster pattern-recognition skills and better compassion to task demands and the social context in which the problems needed to be solved.

For instance, a study by St Germain (2003) related how school principals used tacit knowledge in their decision-making approaches. Interviews with three senior and three novice school principals revealed that senior principals possessed a greater accumulation of tacit knowledge which allowed them to use a calmer approach, visualise the long-term ramifications and perspectives and display a better sense for problem solving. In addition, senior principals highly emphasised the importance of interpersonal relationships. In contrast, novice principals tended to become expressively affected by problems, delaying solving problem and always seemed disconnected from problems. Based on the type of school, senior primary and secondary principals tended to use tacit knowledge when articulating the school's vision and fostering the group's goals. As for the novice primary principals, they mainly used tacit knowledge to foster the acceptance of group goals. In summary, experience alongside tacit knowledge will result in expert leadership in schools.

In 2005, Ruff and Shoho conducted a collective case study related to the practice of using mental models of instructional leadership with three elementary school principals: two seniors and one novice. One of them was an elementary principal who had received an award for school achievement. In addition, two teachers were selected from the three schools studied. Data from interviews, observations, and documents related to principals'



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instructional leadership practices were collected and reviewed. The findings revealed that there were some differences in terms of senior principals with novice principals in many aspects of instructional leadership. For instance, novice principals were highly focused on the strategies and approaches that need to be addressed in determining the instructional programmes that produced significant outcomes for school performance. In addition, novice principals also emphasised the collaborative relationship between the effectiveness of the school's instructional programmes and people, especially superior-subordinate relationships. In the case of senior principals, support was given to teachers in ensuring the positive outcomes of the instructional programmes. Thus, it was concluded that there are differences in the tacit knowledge of the principals based on their experience and reputation.

METHODS

The study's design and sampling

This study employs a survey design to obtain principals' feedback on their tacit knowledge related to their instructional leadership practices in secondary schools. In this sense, Creswell (2009) has mentioned the benefits of using the survey method to obtain feedback from larger samples of a studied population. According to Stockemer (2019), a survey is considered suitable if researchers intend to measure attitudes, perceptions and behaviours. In fact, a survey is considered applicable when studying respondents' thinking, their practices and attributes, how they were obtained, and the extent of the knowledge related to an issue.

A total of 202 secondary principals have been selected to provide their feedback in this study. All these principals were chosen using systematic random sampling based on the names listed at the state department of education and come from four types of school, namely: the rural normal public schools, urban normal public schools, boarding schools and religious-based schools.

Instruments

The instrument for this study is a questionnaire involving 19 items divided into two sections. Section A collects 4 items of demographic information: gender, academic qualifications, leadership experience as a principal and age using a nominal scale.

In section B, items relate to instructional leadership which is in line with the study's objective of understanding secondary principals' tacit knowledge on instructional leadership. The 15 items related to instructional leadership are based on the Principals Management Instructional Rating Scale (PMIRS) developed by Hallinger (2013) version 22. In this study, we used items which were taken from Aziz *et al.* (2014) who have translated the original PMIRS - English version into Malay language. The translated PMIRS - Malay language version has 15 items from the original English language version. The Aziz *et al.* (2014) version is more easily understood by secondary principals and provides much easier and faster assessment for researchers since no further translation is required. There are three constructs represented in the Malay language version of PMIRS: defining the school's mission (5 items), managing the school's instructional programmes (5 items) and, lastly, promoting a positive school learning culture (5 items) giving a total of 15 items.

The item scaling was changed from a five-point Likert scale to a binary or dichotomous 'yes' or 'no' scale. In providing feedback, secondary principals will select 'yes' if they think that an item represents their pertinent tasks as instructional leaders or the instructional tasks that they must practise. In contrast, principals will select 'no' if they think that a listed item does not represent a major role for instructional leaders that they have not practised in their schools.



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Pilot study, reliability and validity values: Before commencing with the pilot study, all items were verified and inspected by various experts and evaluators in school leadership: two senior lecturers from the Institut Aminuddin Baki, Ministry of Education Malaysia, and three officers from state department of education. All five evaluators provided with critical comments on the items and later supplementing with the content validity. Furthermore, two secondary principals were approached and asked to provide a commentary on the items.

In the pilot study phase, five secondary principals attached to public secondary schools were chosen as the sample and their responses to the items analysed to obtain reliability and validity values for the study. Since this study employed a binary or dichotomous scale, the Rasch analysis was selected to obtain reliability and validity values for each item and the person reliability value. From the Rasch analysis, the item reliability for instructional leadership was reported at 0.98. The items' reliability values exceed 0.70 which indicate an acceptable value for reliability. However, the person's reliability was reported as zero which indicated a homogenous sample representative of secondary principals. The fit statistics are the mean squared (MNSQ) and the z standard (ZSTD) with the findings indicating an infit MNSQ value for instructional leadership of 0.99. The infit value of MNSQ for person reliability was reported at 0.98, which is considered as acceptable value which recommended by Wright and Linacre (1994).

Table 1
Rasch measurement results for the instructional leadership

Elements	Item	Person
Reliability values	0.98	0.00
Separation values	6.73	0.00
Infit values of MNSQ	0.99	0.98
ZSTD	0.4	0.1
Variances explained by measures	52.7 %	14.5 %

In inspecting the ZSTD fit statistics for item and person reliabilities, an item value of 0.4 was indicated and 1 for person ZSTDs. The last examine involved the variance measures which indicated 52.7% for item and 14.5% for person reliabilities. The item reliability values exceeded the 40% cut off value proposed by Conrad *et al.* (2011).

Data collection procedure and analysis

Before proceeding with questionnaire distribution, initial permission was obtained from the Education Planning and Research Division (EPRD), Ministry of Education Malaysia and followed by the state departments of education (SDE). A total of 250 questionnaires were distributed to all secondary principals. In providing feedback, secondary principals were given a week to answer all 19 items and to return the completed questionnaires to the SDE offices. All the questionnaires received (80% return rate) were examine and the data were later analysed using descriptive and non-parametric statistics.

The descriptive statistics consisted of percentages for all 19 items of principals' feedback with non-parametric statistically significant differences for gender, leadership experience and age. It was decided to use the Mann Whitney *U* and the Kruskal-Wallis *H* tests to measure significant differences based on principals' demographics and tacit knowledge of instructional leadership because all the data in this study are in categorical and nominal form (Pallant, 2011; Morgan, Leech, Gloeckner & Barrett, 2013; Field, 2013). The Mann-Whitney *U* test is a suitable test for measuring significant differences between two cluster groups (Field, 2013; Abdullah, 2013; Corder & Foreman, 2014). The Kruskal Wallis, test is considered appropriate for examining differentiation involving more than two cluster groups (Abdullah, 2013; Corder & Foreman, 2014). Both the Mann-Whitney and Kruskal-Wallis tests are based on rank data (Field, 2013). To confirm which group or cluster had a significant difference, we used the z-score tests as a continuation test to determine which group of clusters displayed a significant differentiation which resulting from the Kruskal-Wallis *H* test.



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In examining the association between principals' demographics and tacit knowledge on instructional leadership practices, it was decided to use the multinomial logistic regression tests. The multinomial logistics regression test is an extension of binary logistic and suitable statistical test to examine the relationship between binary response variables with nominal scale variables (Leech, Barrett, & Morgan, 2011; Chan, 2005; Field, 2013; Cleophas & Zwinderman, 2016; Weisburd & Britt, 2014)). In this study, the multinomial logistic regression is employed to measure the relationships between categorical data (principals' demographics) with dichotomous data (tacit knowledge in instructional leadership responses).

RESULTS

Descriptive statistics

Principals' demographics

Table 2 illustrates the demographics of the secondary principals that participated in this study. Data from the total of 202 secondary principals who returned their questionnaires were analysed to answer the research questions. Of these, 139 (68.8 %) were male principals and 63 (31.2 %) were female principals. In terms of their academic qualification, almost half of the secondary principals (102=50.5 %) had obtained bachelor's degrees with another 98 (48.5 %) holding master's degrees and two (1 %) holding a doctorate.

Table 2
Secondary principals' demographics

Demographics	Frequency	Percentage
<i>Gender</i>		
Male	139	68.8
Female	63	31.2
<i>Academic qualifications</i>		
Bachelor degree	102	50.5
Master degree	98	48.5
Doctoral degree	2	1.0
<i>Leadership experiences</i>		
Less than 5 years	137	67.85
5 – 10 years	46	22.8
11 – 15 years	10	5.0
More than 16 years	9	4.5
<i>Age</i>		
41 to 45 years old	7	3.5
46 to 50 years old	54	26.7
51 to 55 years old	124	61.4
More than 56 years old	17	8.4

Descriptive analyses based on secondary principals' leadership experience indicated that 137 (67.8 %) secondary principals have been appointed as secondary principals within one to five years and hence can be classified as novice principals. Another 46 (22.8 %) have between five to ten years' leadership experience followed by 10 (5.0 %) with between 11 to 15 years. Only 9 (4.5%) secondary principals have more than 16 years' leadership experience. Finally, the majority of secondary principals (124=61.4%) were aged between 51 to 55 years old with 54 (26.7%) aged



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between 46 and 50 years old followed by 17 (8.4 %) aged 56 years old and above. The youngest batch of secondary principals was aged between 41 to 45 years old (7=3.5%).

Tacit knowledge on instructional leadership

There are 15 items related to instructional leadership encompassing three main constructs: defining the school's mission, managing the school's instructional programmes and, finally, creating a conducive learning climate.

Defining the school's mission

From Table 3 and Figure 1, there are five items that represent defining the school's mission. Based on principals' replies concerning their tacit knowledge on instructional leadership, descriptive results show that the highest achievement was for item 1, 99 % (n = 201) followed by item 4 with 98 % (n = 199). Third was item 3 with 97 % (n = 196) and then item 5 with 83 percent (n = 168). Finally, item 2 obtained the lowest score with only 43 % (n = 88). In summary, secondary principals have in-depth tacit knowledge related to the construct of defining the school's mission and vision with four of the five items scoring above the 80 %.

Table 3
Descriptive results on tacit knowledge on defining the school's mission

Item	Statements	Principals' replies		The correct answer (percentage)
		Yes	No	
1	My task is developing my focused yearly school vision.	201	1	Yes, (99 %)
2	My school's vision was developed by our school leadership team.	114	88	No, (43 %)
3	I did not involve others in the process of developing my school's vision except verifying it in the meeting.	6	196	No, (97 %)
4	My school's vision was established based on previous years' achievements.	199	3	Yes, (98 %)
5	The role to explain our school's vision is given to deputy principals.	34	168	No, (83 %)

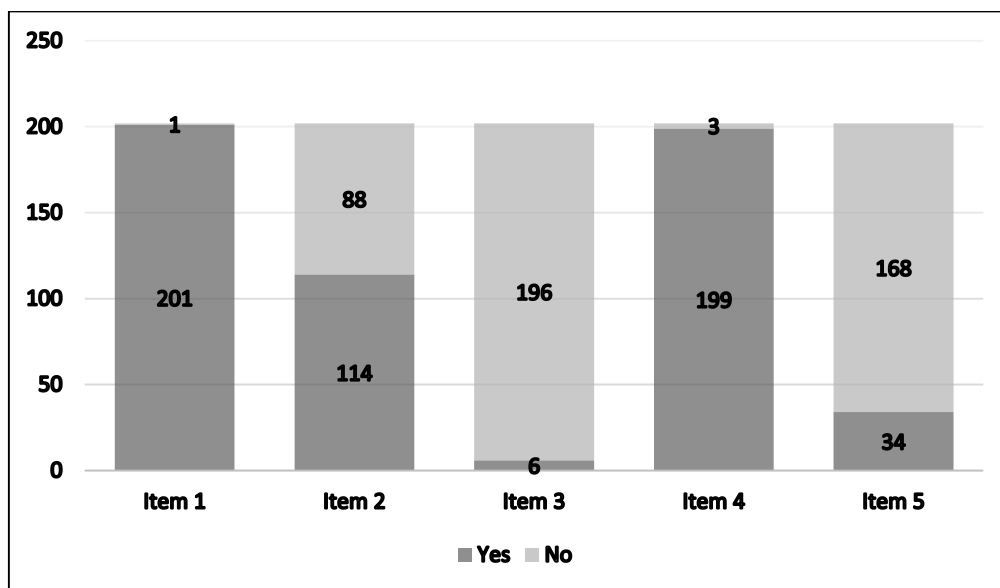


Figure 1. Results on tacit knowledge on defining the school's mission



Managing the instructional programmes

In Table 4 and Figure 2, there are five items that represent managing the instructional programmes. Based on the secondary principals' responses, the highest achievement was indicated by item 5 with 98% (n = 198) followed by item 2 with 96% (n= 194). Next is item 3 with 92% (n= 186) and then item 1 with 89% (n= 180). However, item 4 obtained the lowest response with only 43% (n = 43). In summary, based on the construct of managing the instructional programmes, secondary principals managed to answer all items appropriately except for item 4 in which principals were uncertain about choosing an accurate answer.

Table 4
Descriptive results on tacit knowledge in managing the instructional programmes

Item	Statements	Principals' replies		The correct answer (percentage)
		Yes	No	
1	Focus is given to instructional programmes which aligned with the school's vision.	180	22	Yes, (89 %)
2	It is not my duty to check students' work.	8	194	No, (96 %)
3	I'm highly responsible for coordinating the school's curriculum.	186	16	Yes, (92 %)
4	In school, committed teachers are selected to manage and coordinate the school's curriculum.	159	43	No, (21 %)
5	I employed the previous examination results for curriculum decision-making.	198	4	Yes, (98 %)

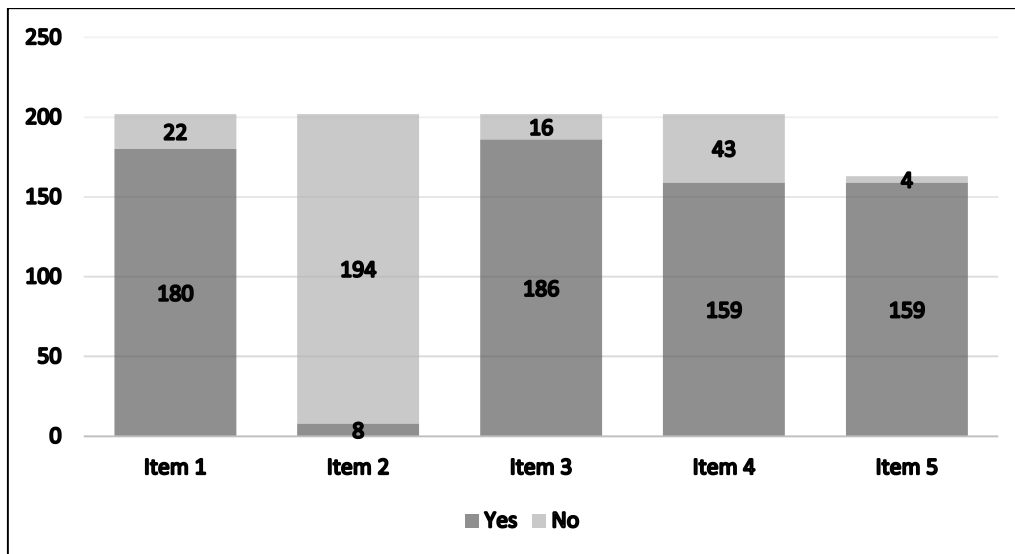


Figure 2. Results on tacit knowledge in managing the instructional programme

Creating a conducive learning climate

Descriptive results in Table 5 and Figure 3 showed that overall findings based on secondary principals' tacit knowledge related to the five items relating to creating a conducive learning climate. Based on the responses, item 4 indicated the highest score of 100% (n = 202). Second, item 3 which scored 99% (n = 200) followed by item 1 with 98% (n = 198). Fourth is item 5 with a score of 85% (n = 171) and item 2 with only 67% (n = 141).



Table 5
Descriptive results on creating a conducive learning climate

Item	Statements	Principals' replies		The correct answer (percentage)
		Yes	No	
1	Teachers were supported to use their instructional time to inculcate new skills.	198	4	Yes, (98 %)
2	I always spend my free time with teachers and students.	61	141	No, (67 %)
3	I am also involved in students' extra-curricular activities.	200	2	Yes, (99 %)
4	I personally praised my teachers for their efforts and performances.	202	0	Yes, (100 %)
5	I recognised my teachers' outstanding performance in writing that is kept in their personal portfolio.	171	31	Yes, (85 %)

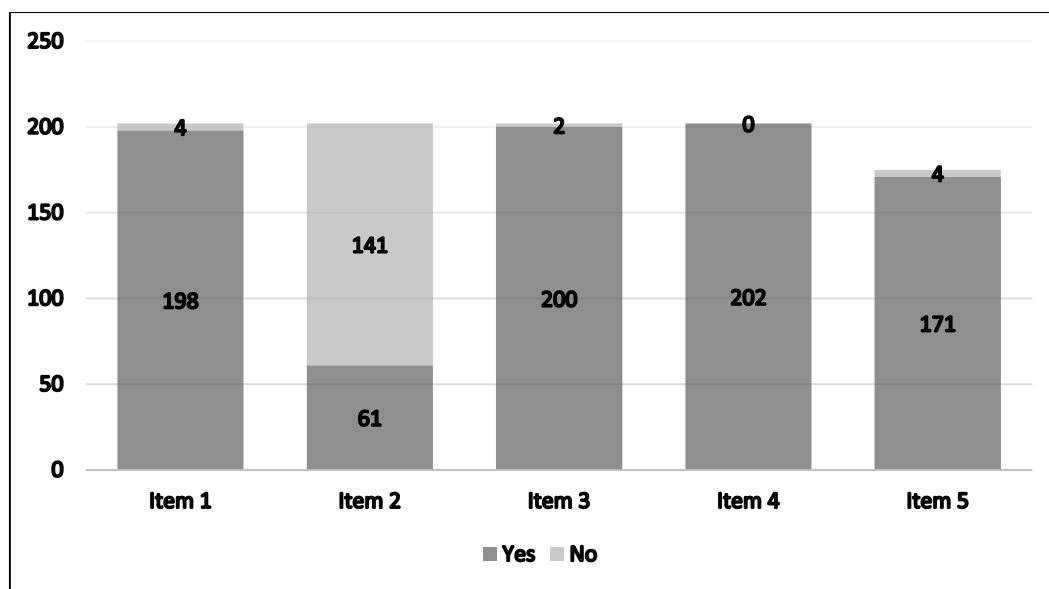


Figure 3. Results on tacit knowledge in creating a conducive learning climate

The non-parametric significant differences

In examining the significant differences related to secondary principals' tacit knowledge on instructional leadership, two non-parametric tests are used: The Mann-Whitney *U* and Kruskal-Wallis *H*. The reason for using the non-parametric tests is based on dichotomous scaling of 'yes' and 'no' that is widely used in this study. Explanations on the significant differences are compared with principals' demographics (gender, leadership experience and age) with items from all three major instructional leadership constructs (defining the school's mission and vision; managing the instructional programme and lastly creating a conducive learning climate).

Defining the school's mission and vision

In Table 6, the Mann-Whitney *U* test reveals that there are no significant differences based on principals' gender



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related to all five items in defining the school's mission and vision; item 1 ($U = 0.45$; $p = 0.501$), item 2 ($U = .19$; $p = 0.65$), item 3 ($U = 0.45$; $p = 0.501$), item 4 ($U = 0.45$; $p = 0.501$) and item 5 ($U = 0.45$; $p = 0.501$). The Kruskal-Wallis H test produced similar findings: item 1 ($H_{(3)} = 0.47$; $p = 0.92$), item 2 ($H_{(3)} = 5.11$; $p = 0.16$), item 3 ($H_{(3)} = 2.96$; $p = 0.39$), item 4 ($H_{(3)} = 3.34$; $p = 0.34$) except for item 5 ($H_{(3)} = 27.7$; $p = 0.00$) which indicated a significant difference. As for principals' age factor, Kruskal Wallis H results indicated three items - item 1 ($H_{(3)} = 0.63$; $p = 0.88$), item 2 ($H_{(3)} = 3.31$; $p = 0.34$), and item 3 ($H_{(3)} = 0.45$; $p = 0.501$), item 5 ($H_{(3)} = 3.78$; $p = 0.28$). As for item 3 ($H_{(3)} = 41.2$; $p = 0.00$) and item 4 ($H_{(3)} = 41.9$; $p = 0.00$), both items indicated significant differences.

Table 6

Tacit knowledge and demographic differences based on defining the school's mission and vision

Item	Tacit knowledge Statements	Differences based on demographics					
		Gender		Leadership experiences		Age	
		U	p	χ^2	p	χ^2	p
1	My task is developing my focused yearly school's vision.	.45	.50	.47	.92	.63	.88
2	My school's vision was developed by our school leadership team	.19	.65	5.11	.16	3.31	.34
3	I did not involve others in the process of developing my school's vision except verifying it in the meeting.	.60	.43	2.96	.39	41.2	.00*
4	My school's vision established was based on previous years' achievements	.00	.93	3.34	.34	41.9	.00*
5	The role to explain on our school's vision was given to deputy principals.	.94	.33	27.7	.00*	3.78	.28

$p < .05$; $N = 202$ secondary principals; Significance level $p < 0.05$ *; $p < 0.01$ **

Next, we further our analyses using the Z-score test to identify and ensure which comparison groups have significant differences. Based on Table 7, the significant difference in item 5 was indicated with huge differences between secondary principals with less than five years' leadership experience and principals with more than 16 years of leadership experience ($Z = -5.0225$; $p = 0.00$). The second analysis is related to secondary principals' age factor with two items indicating significant differences. In matching principals' demographics with items on defining the school's mission and vision, item 3 indicated significant differences between principals aged 46 to 50 years old and principals who are over 56 years old ($Z = -2.895$; $p = 0.005$) and item 4 which showed significant differences between principals aged of 41 to 45 years old and those aged 46 to 50 years old ($Z = -2.777$; $p = 0.005$).

Table 7

Results of z-score on significance differences

Item	Statements	Demographics variables		Z - score	p
		Leadership experiences			
5	The role to explain our school's vision was given to deputy principals	Less than 5 years	16 years and above	-5.225	0.000
		<u>Age factor</u>			
3	I did not involve others in the process of developing my school's vision except verifying it in the meeting.	46 to 50 years old	56 years old and above	-2.895	0.005
4	My school's vision was established based on previous years' achievements.	41 to 45 years old	46 to 50 years old	-2.777	0.005



Managing the instructional programme

Table 8

Tacit knowledge and demographic differences for managing the instructional programme

Item	Statements	Differences based on demographics					
		Gender		Leadership experiences		Age	
		<i>U</i>	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
1	Focus is given to instructional programmes which aligned with the school's vision.	5.16	.01*	3.12	.37	9.34	.02*
2	It is not my duty to check students' work.	3.77	.05	21.9	.00*	3.26	.35
3	I'm highly responsible for coordinating the school's curriculum.	1.25	.26	4.32	.22	5.35	.14
4	In school, committed teachers are selected to manage and coordinate the school's curriculum.	0.27	.60	9.98	.01*	3.98	.26
5	I employed the previous examination results for curriculum decision-making.	1.85	.17	1.90	.59	1.56	.66

p<.05; N= 202 secondary principals; Significance level *p*<0.05*; *p*<0.01**

The Mann-Whitney *U* test indicates that there are no significant differences which is based on principals' gender for all five items in defining the school's mission and vision; item 2 (*U* = 3.77; *p* = 0.05), item 3 (*U* = 1.25; *p* = 0.26), item 4 (*U* = 0.27; *p* = 0.60), and item 5 (*U* = 0.185; *p* = 0.17). However, for item 1, there is a significant difference based on principals' gender (*U* = 5.16; *p* = 0.01). Based on principals' leadership experiences, results from the Kruskal-Wallis *H* test indicate that item 1 ($H_{(3)} = 3.12$; *p* = 0.37), item 3 ($H_{(3)} = 4.32$; *p* = 0.22), and item 5 ($H_{(3)} = 1.90$; *p* = 0.59) are non-significant. For item 2 ($H_{(3)} = 21.9$; *p* = 0.00) and item 4 ($H_{(3)} = 9.98$; *p* = 0.01), there are significant differences. As for principals' age factor, Kruskal-Wallis *H* tests also indicated four items with non-significant findings which are item 2 ($H_{(3)} = 3.26$; *p* = 0.35), item 3 ($H_{(3)} = 0.22$; *p* = 0.53), item 4 ($H_{(3)} = 3.98$; *p* = 0.26) and item 5 ($H_{(3)} = 1.56$; *p* = 0.66). Nevertheless, item 1 ($H_{(3)} = 9.34$; *p* = 0.02) has indicated a significant difference (Refer Table 8).

Table 9

Results of z-score on significance differences

Item	Statements	Demographics variables		Z - score	<i>p</i>
		Leadership experiences			
2	It is not my duty to check students' work.	Less than 5 years	16 years and above	-4.554	0.000
4	In school, committed teachers are selected to manage and coordinate the school's curriculum	Less than 5 years	5 to 10 years	-2.987	0.003
		<u>Age factor</u>			
1	Focus is given to instructional programmes which aligned with the school's vision.	46 to 50 years old	51 to 55 years old	-2.707	0.007

The Z-score test identifies and compares groups which have significance differences. Based on Table 9, the significant difference in item 2 was indicated between secondary principals with less than five years' of leadership experience and another group of principals with more than 16 years of leadership experience (*Z* = -4.554; *p* = 0.00). The second



item that has a significant difference is item 4 which indicated a significant difference between secondary principals with less than five years' leadership experience and another cluster of principals with 5 to 10 years of leadership experience ($Z = -2.987$; $p = 0.03$). The next analysis is related to secondary principals' age factor. In matching principals' demographics with items on managing the instructional programme, item 1 has indicated significant differences between principals aged 46 to 50 years old and principals aged 51 to 56 years old ($Z = -2.707$; $p = 0.007$).

Creating a conducive learning climate

In the construct creating a conducive learning climate, the Mann-Whitney U test reveals that there are non-significant differences in terms of principals' gender based on all five items in defining the school's mission and vision; item 1 ($U = 0.67$; $p = 0.41$), item 2 ($U = 1.00$; $p = 0.31$), item 3 ($U = 0.33$; $p = 0.56$), item 4 ($U = 0.00$; $p = 0.00$) and item 5 ($U = 0.02$; $p = 0.88$). In the second analysis related to principals' leadership experience, the Kruskal-Wallis H test indicated non-significant differences in item 2 ($H_{(3)} = 3.42$; $p = 0.33$), item 3 ($H_{(3)} = .95$; $p = 0.81$), item 4 ($H_{(3)} = 0.00$; $p = 0.00$), and item 5 ($H_{(3)} = 0.41$; $p = 1.18$) with only item 1 ($H_{(3)} = 8.30$; $p = 0.04$) indicating a significant difference. As for principals' age factor, Kruskal-Wallis analysis also indicated non-significant differences in all five items: item 1 ($H_{(3)} = 1.56$; $p = 0.66$), item 2 ($H_{(3)} = 1.79$; $p = 0.61$), item 3 ($H_{(3)} = 5.53$; $p = 0.13$), item 4 ($H_{(3)} = 0.00$; $p = 0.00$) and item 5 ($H_{(3)} = 1.18$; $p = 0.77$).

Table 10
Tacit knowledge and demographic differences with creating a conducive learning climate

Item	Statements	Differences based on demographics					
		Gender		Leadership experiences		Age	
		U	p	χ^2	p	χ^2	p
1	Teachers are supported to use their instructional time to inculcate their new skills.	.67	.41	8.30	.04*	1.56	.66
2	I always spend my free time with teachers and students.	1.00	.31	3.42	.33	1.79	.61
3	I am also involved in students' extra-curricular activities.	.33	.56	.95	.81	5.53	.13
4	I personally praised my teachers for their efforts and performances.	-	-	-	-	-	-
5	I recognised my teachers' outstanding performance in writing which is kept in their personal portfolio.	.02	.88	2.83	.41	1.18	.77

$p < .05$; $N = 202$ secondary principals; Significance level $p < 0.05^*$; $p < 0.01^{**}$

Table 11
Results of z-score on significant differences

Item	Statements	Demographics variables		Z - score	p
		Leadership experiences			
1	Teachers are supported to use their instructional time to inculcate their new skills.	Less than 5 years	16 years and above	1.970	0.049

Table 11 above indicates a significant difference based on Z-score test analysis to identify and compare groups. Item 1 indicates a significant difference between secondary principals with less than five years of leadership experience and principals with more than 16 years of leadership experience ($Z = 1.970$; $p = 0.049$). Based on the z-score results, a significant difference is indicated between novice and senior principals.



Relationship between principals' demographics with their tacit knowledge on instructional leadership

In answering the last research question which is related to the association between principals' demographic variables (gender, leadership experience and age) with secondary principals' tacit knowledge on instructional leadership, we decided to use multinomial logistic regressions. In performing the multinomial logistic regression, the analyses were performed distinctly between principals' demographics (gender, leadership experiences and age) with all three instructional leadership constructs (defining the school's mission and vision, managing the instructional programme, and creating a conducive learning climate).

In examining the principals' demographics as predictors of their tacit knowledge on instructional leadership, analyses were done separately using three values: The Cox and Snell R^2 , Nagelkerke R^2 and values related to the Pearson and Deviance measures of goodness-of-fit. Results are presented in Table 12 below. The analysis showed that principals' gender has not predicted their tacit knowledge since all three constructs of instructional leadership show non-significant results: defining the school's mission and vision ($\beta = 0.60$; Wald = 0.31; OR = 1.602; $p = 0.860$), managing the instructional programme ($\beta = 1.446$; Wald = 3.09; OR = 4.331; $p = 0.079$) and creating a climate conducive to learning ($\beta = 0.381$; Wald = 1.304; OR = 1.46; $p = 0.309$).

In measuring the principals' leadership experiences, there are mixed results showing that principals' leadership experience is not a significant predictor to the principals' tacit knowledge in two constructs: defining the school's mission and vision ($\beta = 0.073$; Wald = 0.075; OR = 1.076; $p = 0.784$) and managing the instructional programme ($\beta = 0.23$; Wald = .26; OR = 1.267; $p = 0.607$). However, principals' leadership experience has predicted the principals' tacit knowledge on instructional leadership for the element of creating a conducive climate to learning ($\beta = 0.613$; Wald = 4.884; OR = 1.84; $p = 0.027$). This result indicates that the odds ratio of predicting will grow at 1.84 times for each point increase in principals' leadership experience.

The last element is the principals' age. Based on nominal logistic regression results, principals' age is not a significant predictor of principals' tacit knowledge of defining the school's vision and mission ($\beta = 0.040$; Wald = 0.024; OR = 0.961; $p = 0.876$) or creating a conducive climate to learning ($\beta = -0.465$; Wald = 2.540; OR = 0.62; $p = 0.111$). However, principals' age is predictive for managing the instructional programme ($\beta = 1.63$; Wald = 6.02; OR = 0.194; $p = 0.014$). Hence, the ratio value is 0.194 which indicates that the odds ratio of predicting will increase by 0.19 for each point increase in principals' age. To summarise, there is small percentage of contributions on principals' demographic variables with their tacit knowledge on instructional leadership.

Table 12
Multinomial logistic regression results on secondary principals' tacit knowledge

Predictors/ Demographics	Instructional Leadership dimensions											
	Defining the school's vision and mission				Managing the instructional programme				Creating a climate conducive to learning			
	β	Wald	Sig	Odds Ratio	B	Wald	Sig	Odds Ratio	β	Wald	Sig	Odds Ratio
Gender	.060	.031	.860	1.062	1.446	3.09	.079	4.331	.381	1.304	.309	1.46
Leadership experiences	.073	.075	.784	1.076	.23	.26	.607	1.267	.613	4.884	.027	1.84*
Age	.040	.024	.876	.961	1.63	6.02	.014*	.194	-.465	2.540	.111	.62
Significance at $p < 0.05^*$; $p < 0.01^{**}$				Significance at $p < 0.05^*$; $p < 0.01^{**}$				Significance at $p < 0.05^*$; $p < 0.01^{**}$				
<i>Pseudo R² values</i>				<i>Pseudo R² values</i>				<i>Pseudo R² values</i>				
Cox and Snell $R^2 = 0.158$				Cox and Snell $R^2 = 0.134$				Cox and Snell $R^2 = 0.099$				
Nagelkerke $R^2 = 0.183$				Nagelkerke $R^2 = 0.159$								



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Goodness of fit values
Pearson = 37.317
Deviance = 43.160.

Goodness of fit values
Pearson = 44.783
Deviance = 47.252.

Nagelkerke $R^2 = 0.115$
Goodness of fit values
Pearson = 40.394
Deviance = 37.926

DISCUSSION

Admittedly, there has been little local research into principals' tacit knowledge in the context of school leadership even that related to instructional leadership. Despite the issues and challenges faced in studying principals' tacit knowledge, there are benefits to be obtained. Ruff and Shoho (2005) affirmed on the benefit as reason for studying school leaders' tacit knowledge: it has the capacity to reveal the tacit assumptions associated with school leaders' capacities in leading their schools. This practice has significant implications for students' academic achievement. The second benefit is to understand how principals able to solve their instructional challenges and problems based on their tacit knowledge in instructional leadership.

In understanding Malaysian secondary principals' tacit knowledge of their instructional practices, a survey related to the practice of instructional leadership was administrated to selected secondary principals. In the survey, they were asked to respond on three major constructs of instructional leadership: defining the school's mission and vision, managing the instructional programme and creating a conducive climate to learning. The constructs have 15 items in total. Descriptively, findings revealed that secondary principals have wide knowledge related to instructional leadership practice since most of them have answered the items with the correct answers/schema. Based on 15 items, secondary principals managed to obtain 12 items with more than 80% correct answers. As such, it is believed that secondary principals in Malaysian secondary schools have in-depth knowledge related to instructional leadership based on descriptive results in which they have excelled in terms of their tacit knowledge on instructional leadership. Thus, this finding is congruent with Harris et al (2017)'s viewpoint that Malaysian principals have adequate understanding of their responsibilities and roles in practising and improving instructional practice.

Nevertheless, there are three items within the instructional leadership framework that principals found confusing. These three items are from each of the three constructs. The most confusing item faced by principals is the item which stated 'select committed teachers to manage and coordinate the school's curriculum' from the managing the instructional programme construct. In this item, only 43 from 202 principals (21%) managed to answer the item correctly. Based on the instructional leadership practice, it is the responsibility of a school principal to manage and coordinate the school's curriculum not that of committed teachers. The second item which principals found difficult to answer is an item from the 'developing the schools' vision and mission' construct. The item's statement is focused on the main significant role of the school leadership team to develop the school's vision. Based on the instructional leadership framework, the process of developing the school's vision and mission is requiring collaborative efforts between the school principals with their school leadership team. The reason behind the collaborative effort statement is to ensure that all middle layer leaders and senior teachers understand and are in agreement. In this item, only 88 or 43 per cent principals managed to respond with the correct answer. The last item is from the last construct of creating a climate conducive to learning. Responses towards the particular item were considered acceptable when 141 principals or 63% managed to give an accurate answer. Nevertheless, 61 principals did not do so. This item is considered unclear since it doesn't relate with the practice of creating a conducive learning climate. As such, the item is just elaborating that principals spend most of their free time mixing with their teachers and students in the school compound.

In measuring the significant differences based on principals' demographics, there are smaller differences for gender and age. Based on results from the non-parametric tests, we can conclude that there is least difference in terms of principals' tacit knowledge on instructional leadership based on principals' gender although there are high numbers of male compared to female principals in this study. However, in terms of principals' leadership experiences, there are huge differences between novice with senior principals. From the non-parametric analyses, differences quite frequently appear between principals who have less than 5 years' experience in leading their schools and another



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cluster of principals who had been leading their schools for more than 15 years. Another term to show a significant difference is between novice principals and senior principals. In terms of principals' age factor, there are also small differences based on principals aged over 50 years with principals in their 40s. The differences based on principals' age factor are much associated with their leadership experience which indicates that senior principals are much older and have wider experience compared to principals in their 40s who are classified as novice principals. This is because principals in Malaysian secondary schools are appointed as principals within their late 40's after completing their wide middle layer leadership experience as a head of department followed by a post as deputy principal. As such, the findings match with previous studies on principals' tacit knowledge which also mentioned that there are differences between novice and senior principals in terms of their tacit knowledge or assumptions while practising their leadership, especially towards school effectiveness (Ruff & Shoho, 2005; St Germain, 2003; Leithwood & Rosenbach, 1992).

Finally, the study also tried to measure whether the principals' demographics are capable of predicting the three major constructs related to tacit knowledge on instructional leadership: defining the school's mission and vision, creating a culture conducive to learning and managing the instructional programme. The regression analysis clearly shows that a principal's leadership experience can predict the practice of managing the school's instructional programme. In addition, the principals' age factor also made a contribution towards the instructional practice of creating a climate conducive to learning in schools. In addition, principals' age was also seen as a predictor for tacit knowledge related to managing the instructional programme. The findings coincide with the previous discussion that the principals' leadership experience and age are the demographic factors that are capable of creating and influencing differences within principals' instructional leadership practice in schools. This indicates a linkage between principals' experience and age with their leadership practices probably focusing on instructional matters or other related leadership practices while ensuring their schools are improving in terms of their academic achievements. Notably, the findings are consistent with Jones *et al.* (2015) who affirmed that principals' noteworthy roles and influences into schools' performance, especially related to academic and instructional matters.

Practical implications

The findings suggest that the performance of our secondary principals is related to their tacit knowledge on instructional leadership. There seems little to suggest for improving principals' tacit knowledge of instructional leadership. However, previous researchers (Nestor-Baker & Hoy, 2001; Ozmen, 2010) have provided three suggestions on how to improve tacit knowledge in the context of educational settings. First, the organisational leaders must always provide a platform or culture to disseminate and/or welcome organisational learning. Later, this will benefit all members in the organisation. In the context of school principals, it is suggested that they emphasise a culture of life-long learning and sharing knowledge with teachers and other principals in order to improve other, especially novice, principals' tacit knowledge related to instructional leadership.

Second, it is suggested that the Ministry or education authorities create a mentoring system where all senior principals can share their wide and fruitful knowledge of how to improve their school's academic performance. Through such a mentoring system, tacit knowledge will transfer to become explicit knowledge which is much easier to share through discussion or dialogue where senior principals can provide their novice colleagues with insights from their wide and successful experience. In addition, organising knowledge sessions such as exhibitions, informal meetings, informal colloquia and excursions are some events that can capture, share and generate knowledge that can be practised in educational institutions. Third, joint collaboration between novice and senior principals through problem-solving cases, expert-novice cooperation and reflective feedback is suggested as ways for educational leaders to enhance others' tacit knowledge.

In improving the leadership capacity of aspiring principals, especially related to instructional leadership, researchers (Wasonga & Murphy, 2006; Hess & Kelly, 2005) believed that an internship programme could be impactful for school leaders' tacit knowledge. Through an internship programme, novice principals will be exposed to, and learn



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informally from, senior principals who have wide tacit knowledge on leading their schools, especially instructional leadership. Such a programme allows prospective principals to engage in interactive activities where they can ask questions of their seniors about obtaining the knowledge, skills and experiences to become effective school principals (Wasonga & Murphy, 2006). In their training as prospective principals, Morrison (2005) stressed that principals need to be exposed to real-life experiences to welcome them to 'the trenches' by learning to solve problems which typically occur on a daily basis. Through an internship programme, prospective principals are exposed and trained in the complexities of school administration which are often not taught within their leadership preparation courses.

This study's limitations and suggestions

While studying principals' tacit knowledge on instructional leadership, certain limitations are acknowledged. First, this study involved 202 secondary principals who participated by giving their feedback on their instructional leadership practice. Thus, the findings from this study are not necessarily representative of the overall population of secondary principals in Malaysian schools. Therefore, we encourage a future study to increase the number of principals in the sample to obtain a more comprehensive overview related to secondary principals' tacit knowledge of practising their instructional leadership. Through the high numbers of principals in such a study, more generalisable findings can be obtained.

The sample in this study involved secondary principals only. Primary principals, who form a bigger population compared to secondary principals, were not involved. Thus, the study's feedback relates to the perceptions and points of view of secondary principals. It is suggested that a future study should take a much bigger sample from both secondary and primary principals. Through sampling both groups of school leaders, comparison can be made in terms of principals' tacit knowledge related to the practice of instructional leadership in schools. Such a comparison might suggest new programmes capable of supporting principals, especially related to the knowledge and practice of instructional leadership.

Third, the study employed a post-positivist approach where only survey or questionnaires are being used to obtain principals' tacit knowledge on instructional leadership. Further, the analyses used also involved non-parametric statistical analyses to measure significant differences and correlations between principals' demographics and their tacit knowledge of instructional leadership practice. In future, it is advisable to use mixed methods to obtain more comprehensive and in-depth findings related to principals' tacit knowledge of instructional leadership practices. Through the mixed method design, the qualitative findings have the capacity to compliment and provide more in-depth explanations of the study data which are lacking from the quantitative findings alone. Third, this study employed the Mann-Whitney U and Kruskal-Wallis H non-parametric analyses instead of the parametric tests. The reason for using the non-parametric statistical analyses relied on the data and scaling responses which use a dichotomous scale of 'yes' and 'no'. In terms of using the non-parametric analyses, we are also aware of the difficulty of generalising the findings of the study. Thus, we strongly suggest that a future study should change the scaling of the questionnaire to a five- or six-point Likert scale to use more appropriate parametric statistical analyses such as the t-test, ANOVA and multiple regression in order to generalise the findings.

CLOSURE

As a final point, this study has shed some lights and insights on a little-studied topic within the context of Malaysian leadership practice, namely tacit knowledge on instructional leadership. Thus, this study conveys recommendation to the education authorities to provide continuous professional development programmes as support such as mentoring, sharing sessions and internship as support programmes for the less-experienced principals. As suggested by Ruff and Shoho (2005), studying principals' tacit assumptions or knowledge provides an in-depth understanding of the knowledge, approaches and strategies employed by principals to ensure their schools are reaching the expected standards of academic achievement and effectiveness. This study hopes to provide a clear picture of the



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principals' instructional leadership practice and suggestions are advanced for a more comprehensive overview of research findings which will later benefit school performance.

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