

**PRIMARY SCHOOL TEACHERS' PRACTICE  
OF DIGITAL WISDOM IN THE CLASSROOM**

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**UNIVERSITI SAINS MALAYSIA  
2018**

# **PRIMARY SCHOOL TEACHERS' PRACTICE OF DIGITAL WISDOM IN THE CLASSROOM**

by

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**Thesis submitted in fulfillment of the requirements  
for the degree of  
Master of Arts**

**September 2018**

## **ACKNOWLEDGEMENT**

I wish to express my deepest appreciation to my supervisor, Professor Dr. Balakrishnan and my co-supervisor Associate Professor Dr. Zarina Samsudin for indulging me in many inspirational discussions and fruitful sharing sessions. Their continuous guidance has enriched the understanding of my professional academic career. Without their patience, time and support this thesis would not have been completed.

My gratitude also goes to the Ministry of Education Malaysia for offering me the MyBrain15 scholarship and fulfilling my dreams of obtaining a Master's Degree in Research Mode. I will contribute the knowledge and wisdom obtained from the research to the advancement of our Nation's education system.

I wish to dedicate this piece of work here to my parents, Ramdas and Santha Devi who have been my pillars of strength and motivations. Without their sacrifice, support and love for me, I would not have succeeded in my academic pursuits.

I also dedicate this thesis to my family, that I love and miss every time whenever I am away to my desk to concentrate on this thesis. To my husband Ramkumar, thank you for being amazingly understanding and supportive. My children, Omishwar Nagadev and Yehgesh Haradev, who are the gems and inspirations of my life. All of you are the reasons why any struggle that comes my way could not deter or break me. I am also indebted to my friends and colleagues as they have also supported me immensely throughout this journey.

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# **MENEROKA AMALAN KEARIFAN TEKNOLOGI DIGITAL DALAM BILIK DARJAH DI KALANGAN GURU SEKOLAH RENDAH**

## **ABSTRAK**

Kajian ini dijalankan untuk meneroka amalan kearifan teknologi digital dalam kalangan guru sekolah rendah di Pulau Pinang. Instrumen penyelidikan yang digubal hasil daripada gabungan Teori Kearifan Monika Ardelt (2013) serta Model ASSURE Heinrich dan Molenda (1999). Instrumen tersebut mengandungi enam dimensi dan 38 item. Demi memastikan instrumen tersebut mempunyai kesahan dan kebolehpercayaan ianya telah dirujuk kepada dua orang pakar dalam bidang Kajian dan Inovasi serta pakar dalam bidang Teknologi Pendidikan. Penerokaan analisis faktor dan ujian Alpha Cronbach dijalankan selepas kajian rintis supaya kebolehpercayaan instrumen dipertingkatkan. Instrumen ini kemudian digunakan dalam kajian sebenar dan data diperolehi daripada 372 responden. Dapatan kajian menunjukkan bahawa; i) Guru-guru mengamalkan kearifan teknologi digital dengan kadar sederhana, ii) Status digital mempunyai hubungan yang signifikan tetapi lemah dengan amalan kearifan teknologi digital, iii) Terdapat hubungan signifikan dan sederhana di antara umur dan amalan kearifan teknologi digital, iv) Lokasi sekolah tidak mempunyai hubungan dengan amalan kearifan teknologi, v) Jantina guru tidak mempunyai hubungan dengan amalan kearifan teknologi, vi) Pengalaman mengajar mempunyai hubungan signifikan dan sederhana dengan amalan kearifan teknologi dan vii) Tiada hubungan di antara tahap pendidikan guru dengan amalan kearifan teknologi. Keputusan kajian ini memberi gambaran yang penting mengenai tahap dan hubungan kearifan teknologi digital dalam kalangan guru. Kajian ini adalah salah satu kajian rintis dalam bidang kearifan teknologi di Malaysia dan membantu memperluaskan lagi skop kajian dalam bidang teknologi pendidikan.

# **EXPLORING PRIMARY SCHOOL TEACHERS' PRACTICE OF DIGITAL WISDOM IN THE CLASSROOM**

## **ABSTRACT**

This research is carried out to explore the practice of digital wisdom among the primary school teachers in the selected schools in Penang. The research instrument for this study was developed using Monika Ardel's (2003) theory on wisdom and Heinrich and Molenda's (1999) ASSURE instructional design model. The instrument consists of six dimensions and 38 items. To ensure its reliability and validity, the instrument was reviewed by two experts in Research and Innovations and an expert in Educational Technology. The instrument also went through pilot study, exploratory factor analysis and Cronbach's Alpha test to ensure its internal consistency. The instrument was then used in the actual study and data was collected from 372 respondents. The findings show that; i) Most teachers practise digital wisdom in their classroom moderately, ii) Digital status has a significant but weak relationship with the practice of digital wisdom, iii) Age has a significant and moderate relationship with the practice of digital wisdom, iv) There is no significant relationship between the locality and the practice of digital wisdom, v) Gender has no significant relationship with the practice of digital wisdom, vi) There is a significant and moderate relationship between experience and the practice of digital wisdom and vii) Education level of the teachers has no significant relationship with the practice of digital wisdom. The results obtained yields insights on the level of digital wisdom possessed by the teachers and relationships that exist between the practice of digital wisdom and the demographic profiles of the teachers. This study is one of the first few studies related to digital wisdom carried out in Malaysia and it broadens the research scope in the field of instructional technology.

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction**

Education Policies in Malaysia has incorporated Information and Communication Technologies in line with the Malaysia's vision to be a developed country in the year 2020 as pointed out by Cheah and Merican (2012). Nikian et al. (2013) asserted that the application of technology and learning in schools has improved the technology in learning in schools. They also indicated that the use of technology has shown promising results for the educators, learners and education itself. Cheah and Merican (2012) have indicated that the launching of Multimedia Super Corridor (MSC) has resulted in the establishment of Smart Schools in Malaysia in order to make teaching and learning experience more meaningful through the use of multimedia technology. According to Wei and Kannan (2017) the seventh shift in the National Education Blueprint (2013) focuses on the leverage of information and communication technology to improve education in Malaysia. Therefore, efforts are being taken to provide access to educational technology to schools in the country.

The Umar and Yusoff (2014) pointed out that the ministry have fused digital technology for the purpose of teaching and learning. Many initiatives have been put into realisation of effective teaching and learning using digital technology. Grapragasem (2014) asserted that textbooks are no longer extensively used in the classroom as the source of knowledge acquisition. Activities are now carried out using digital technologies as electronic media and ICT has become the main element of knowledge acquisition. Noh et al. (2016) pointed out that EduwebTV is currently

implemented in Malaysian school for the use of teaching and learning. According to Hoque et al. (2012), the use of digital technology such as the ICT in school setting enhances teaching and learning effectiveness and motivates the students. Cheah and Merican (2012) emphasized that in years to come more people will embrace the lifelong learning and the use of digital media in the classroom.

Since too much emphasis has been placed in utilising digital technology in education, it is crucially important also to look into human factor, the ones who would make the “Vision 2020” a reality, for example, the educators. Sheldon and Byers (2002) indicated that recent studies suggest that the teachers were not fully utilising digital technology in their pedagogy although their schools have provided all the technologies needed to assist teaching and learning. Furthermore, the challenges to teachers’ use of ICTs are found to be pedagogical, curricular, and methodological as remarked by Hokanson and Hooper (2004). To overcome this, Hixon and Buckenmeyer (2009) suggested that the advancement into higher levels of digital tools integration in teaching and learning is required as it changes teachers’ beliefs in utilizing digital tools in the classroom.

Having laid out the significance of using digital technology in the classroom and integrating digital tools in teaching learning, the question remains if the educators are currently using effective ways in carrying out such lessons. In this research, it is highly relevant to find out if educators are wise in using technology in their instructions. According to Prensky (2011) the need for wise people to discuss, define, compare, and evaluate perspectives would not stop but the means by which they do so and the quality of their efforts are growing more sophisticated due to digital technology. As a result, the ‘unenanced’ brain which is not assisted by

digital technology is well on its way to becoming insufficient for truly wise decision making. A teacher is considered to have digital wisdom if he or she is capable of using technology not only to teach but also capable of fulfilling the need of current students who are no stranger to current technology. Prensky (2014) asserted that current students' brains are extended and enhanced by our new technology. They are also becoming more capable as they are provided with new capacities such as the ability to collect and analyse trillions of information units using digital technology. As such, it is obviously crucial for the teachers to harness the wisdom that arises from the use of digital technology to educate such cutting-edge students.

## **1.2 Background of the study**

Developing new practices between existing pedagogical practices with new technological component may seem challenging for even experienced teachers. Blau et al. (2014) explained that when a technology is presented, experienced teachers would have to update their technological knowledge and integrate it into the pedagogical and content knowledge that they already possess. Bauer and Kenton (2005) remarked that since teachers have struggled to realign their ideas about teaching and learning with technology, they must tackle the barriers that may emerge along the process and the effort to become familiar with technology alone may not be adequate. This means there could be difficulties to blend digital technology with the pedagogical practices that educators have developed throughout their teaching career. Therefore, digital wisdom is truly required for these experienced teachers to be able to develop new habits in their pedagogical practices that would enable them to deliver quality instructions. Blau et al. (2014) defined digital wisdom as a wise use of technology in order to enhance the quality of instruction. Teachers with wide knowledge on technology but without wisdom may not be able to address issues

effectively in the classroom. Sternberg (2001) claims that knowledge alone is inadequate for wisdom and certainly does not assure satisfaction or happiness.

Similarly, knowledge alone may not be sufficient in conducting technology based lessons as it may not assure the effectiveness of the lessons. Digital wisdom is needed to address issues that may arise in instructions as the teachers would be more informed before deciding a solution. Prensky (2012b) pointed out that the digitally wise allows technology to enhance their thinking and understanding therefore the decisions made is more informed and supported by digital enhancement.

According to Storz and Hoffman (2013), effective classroom management is needed so that the digital technology that offers opportunities for gaming and chatting can be used as a learning tool rather than a distraction. Sanchez et al. (2017) indicated that video games can be used for students to learn in a more entertaining way which would increase students' engagement in learning. Adding to that, the ever-evolving technology would always present new demands on teachers to use them as a medium to deliver instructions required. Therefore, digital wisdom is needed in areas such as class management, suitability of lesson content and understanding the digital competence of their students.

Blau et al. (2014) remarked that in school and out of school computer use is different. Digital natives may be proficient with personal and social uses of technology that they widely utilize outside the classroom but they may not possess important technological skills needed for learning purposes. Thus, Lee and Spire (2009) suggested that teachers should find ways to bridge this gap. Prensky (2011) stated that teachers despite their digital status will be able to find ways to make their

students learn provided they use the digital wisdom as wisdom transcends the generational divide defined by the immigrant and native differences.

Prensky (2012b) stated that a person immersed in various technologies might be called digitally wise. Using digital technology in teaching and learning may provide opportunities for the teachers to harness digital wisdom. Past studies have shown that digital natives are more confident in using digital technology (Ghavifekr et al., 2015) where else digital immigrants try hard to keep up with new technologies (Dornisch, 2013). Previous research has shown that age and experience correlates negatively with the use of digital technology in classroom (Kumutha and Yamat, 2014). However, the locality of school and education level correlates positively with the use of digital technology (Noh et al., 2016). Ghavifekr et al. (2015) in his study found there is also a relationship between gender and the use of digital technology in the classroom. Therefore, this study will reveal the level of practice of digital wisdom among primary school teachers. It will also study the relationship between the teachers' digital status (native or immigrant), age, teaching experience, locality of school, gender and education level and the practice of digital wisdom in the classroom.

### **1.3 Problem Statement**

The growing trend in utilization of digital technology in schools has changed the teachers' role from teacher centered educational environment to a student centered environment as described by Noraini et al. (2016).

Prensky (2014) asserted that what the current students need is rather a curriculum based on what the students would require to be successful in the future. He also added that current curriculum which was intended for an earlier time would

not be able to provide the necessary skill for the ‘real future’. As such circumstances, the teachers or educators must harness digital wisdom related to his or her teaching and learning practices to explore new pedagogical approaches that would benefit their students in future.

Leow et al. (2016) noted that effective learning is not assured just by incorporating digital learning technologies instead it includes improving students’ social interaction and motivation. Lack of digital wisdom by the teacher may lead to technology resistance among students. Coke (2009) advocated that although a teacher cannot make her students love digital technology, the teacher could use her digital wisdom and enable them to use the technology in a more meaningful way to assist their learning.

According to Ali and Nor (2010), they found that some teachers were not aware or informed of sources such as articles or journals and online forum. This shows a serious lack in digital wisdom among teachers. In worst scenario, there were also teachers who do not integrate digital technology in their instructions. This has been identified from their teaching and learning record book.

Noh et al. (2016) pointed out that teachers with higher education level are more open to modern technologies. Garba et al. (2015) revealed that there were teachers that requested to be transferred from Smart school as they are not able to keep up with the modern technology in classroom. It was also shared by the teachers that they would face technical problems and these would delay the progress of the lesson. This also leads to reduced teaching hour.

Nagaletchimee (2016) stated that current learners prefer multitasking, online interactions and collaborative learning environments. Teachers should equip themselves with adequate skills and wisdom to provide these needs to them. This is due to the gap between students and teachers' relationship and they need to find ways with suitable pedagogical practices. The importance of digital wisdom must be educated in continual professional development. Malaysian teachers need digital wisdom to move away from Confucian education culture where a greater proportion is centered on learning from textbook and memorizing facts as claimed by Yieng and Saat (2013).

Research by TIMMS (2011) as quoted in Yieng and Saat's (2013) article reveals that most teachers do not use the computers to enhance their students' cognitive skills to look up for ideas and information, experiments, studying using simulators, process and analyse data and practice skills and procedures. Prensky (2012) asserted that Digital wisdom means not just manipulating technology easily or creatively, but it is needed for the teacher to provide tools such as problem solving and enquiry based activities with which students formulate and test their ideas and relate their idea in collaborative environment.

Malaysian teachers are also found by TIMMS (2011) to use digital technology such as softwares didactically and therefore students are weak in knowing and applying reasoning skills. Even though there may be young people who are digital natives who were born in the digital age, Prensky (2012) asserted that they may not be digitally wise therefore teachers must first be digitally wise to encourage their pupils to cultivate digital wisdom as they grow up in 21st century world.

Ziden et al. (2011) conducted a study involving Year 4 students in primary school and found that there was a positive correlation between the use of ICT in teaching and learning with students' achievements. Students' achievements have increased when ICT is used in a lesson. In a non-ICT based lesson, students' achievements were found decreasing. Therefore, it has been stated by Ziden et al. (2011) that to increase students' achievements, teachers should put more effort to use ICT in their lesson.

In conclusion to the above issues that have been pointed out, further researches must be carried out to determine the source of digital wisdom and how it can be harnessed by today's teachers and educators.

#### **1.4 Purpose of the Study**

The purpose of the study is to explore the practice of digital wisdom of primary school teachers in the classroom and its relationship between the selected demographic variables. Chan (2017) pointed out that early schooling years are critical period for children as this is the time they develop solid fundamentals in their learning. Since, primary school teachers lay the foundation in their pupils' learning, they are chosen as the respondents of this study. The demographic variables are age, experiences, digital status (digital natives or digital immigrants), gender, and locality of school. This relationship study will relate the demographic variables to the practice of digital wisdom by teachers. Since this study explores the relationship of the said demographic variables and the practice of digital wisdom among the teachers, we can identify if an increase or decrease in one variable corresponds to an increase or decrease in the other variable. This study investigates and confirms through the quantitative findings of the significant connections between the selected

demographic variables and the practice of digital wisdom among the primary school teachers.

### **1.5 Research Objectives**

The objectives of this study are as follows: -

- i. To examine the extent of teachers' practice of digital wisdom in primary school.
- ii. To study the relationship between the demographic variables;  
a) digital status b) age c) locality d) gender e) teaching experience  
f) education level and digital wisdom of primary school teachers.

### **1.6 Research Questions**

The primary research questions for this study are listed below:

- (1) What is the level of primary school teachers' practice of digital wisdom in the classroom?
- (2) Is there a relationship between the teachers' practice of digital wisdom with;
  - a. Digital status (digital immigrant or digital natives)
  - b. Age
  - c. Locality of the school
  - d. Gender
  - e. Teaching experience
  - f. Education level

## **1.7 Theoretical Framework**

This research study is carried out based on these theories; Prensky's Digital Wisdom and Monika Ardel's Theory of Wisdom. These theories are used as the basis of hypotheses as well as to facilitate understanding of concepts of wisdom and variables involved.

### **1.7.1 Digital Wisdom**

Prensky (2012a) pointed out that digital wisdom is similar to practical wisdom as both involves "moral skills" and "good judgment". He also pointed out that technology can help us to become better thinkers and make wiser decisions and choices. This is because digital wisdom allows the integration of current technology into our decision making and considerations in a prudent way. As technology now plays a huge part in education and the emphasis on utilising digital technology in 21st century. Pensky (2012a) believes digital wisdom must be learned and taught as well. In other words, teachers must harness the essence of digital wisdom in order to teach in a way that is digitally wise. Prensky (2012a) also insisted that apart from using the technology in the teaching, the focus should also be on the skills that are enhanced. In other words, aiming to teach computer based lessons alone are not sufficient, teachers should also know why they are teaching the lessons and what are the skills taught in the lessons. In conclusion, this theory suggests that the real digital wisdom lies in combining the technology with better pedagogy to produce the best result as this would allow the students to be more prepared to face their future with required skills.

### **1.7.2 Ardelt's Theory of Wisdom**

Ardelt (2003) conceptualized wisdom as latent variable integrating cognitive, reflective, and affective dimensions. The cognitive wisdom dimension involves the ability to understand life and the deeper meaning of events as they relate to intrapersonal and interpersonal matters. She also argued that the reflective dimension of wisdom is essential for the development of the cognitive dimension, given that a deeper understanding of life is possible only if individuals engage in reflective thinking. The development of self-awareness and insight diminishes an individual's self-centeredness, subjectivity, and projections and facilitates understanding. The affective dimension involves positive feelings and behaviors toward others and the absence of indifferent or negative feelings and behavior. Figure 1.1 shows the theoretical framework of this study.

## **1.8 Conceptual Framework**

The conceptual framework shows the variables used, participants of this research and elements involve in the instrument to study the practice of digital wisdom among the primary school teachers. The correlation between the variables and the practice of digital wisdom is studied using the instrument. The instrument is put together using the ASSURE Model, Ardelt's Theory of Wisdom and principles of digital wisdom. Figure 1.2 shows the conceptual framework of this study.

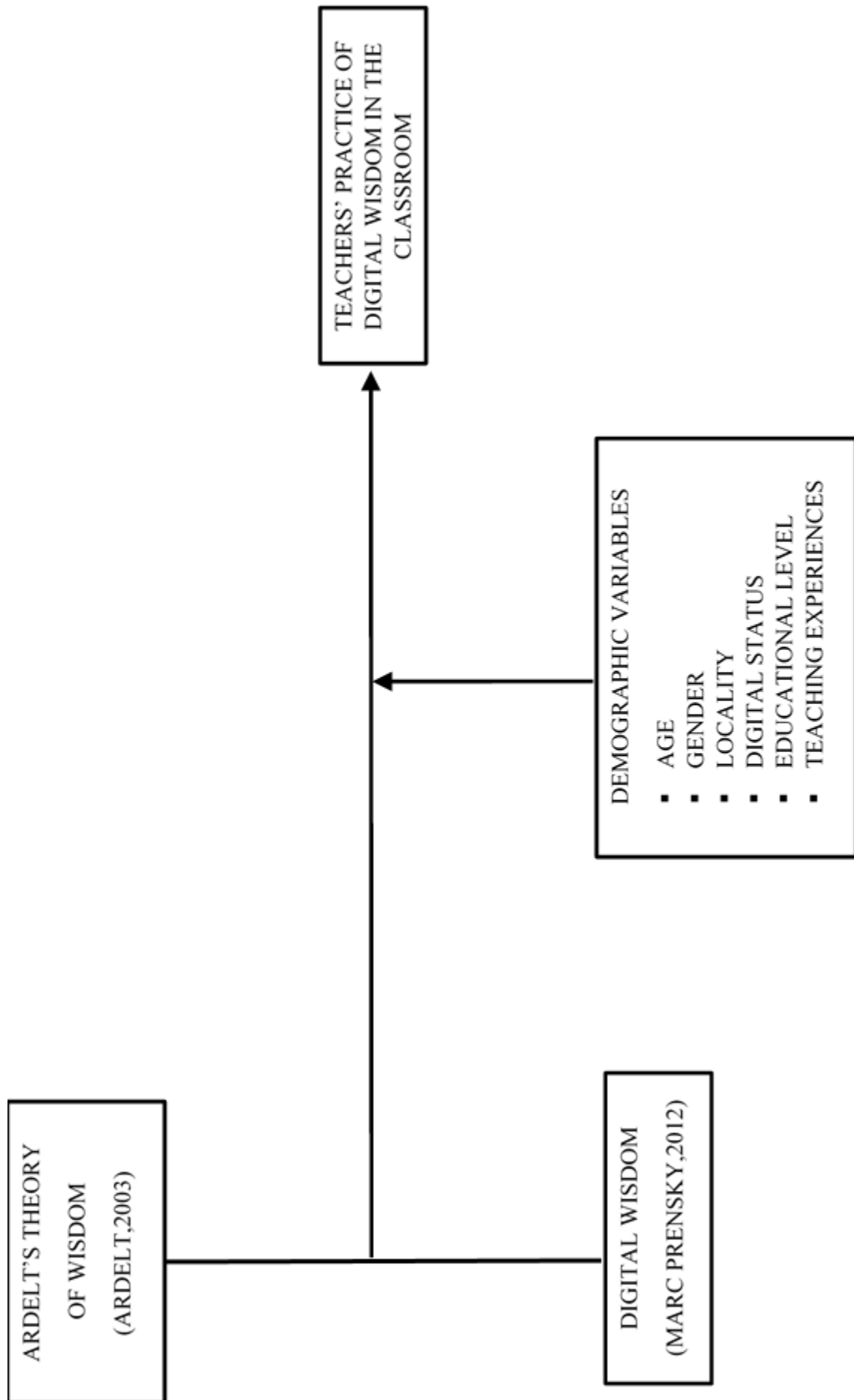


Figure 1.1 Theoretical Framework of the Study

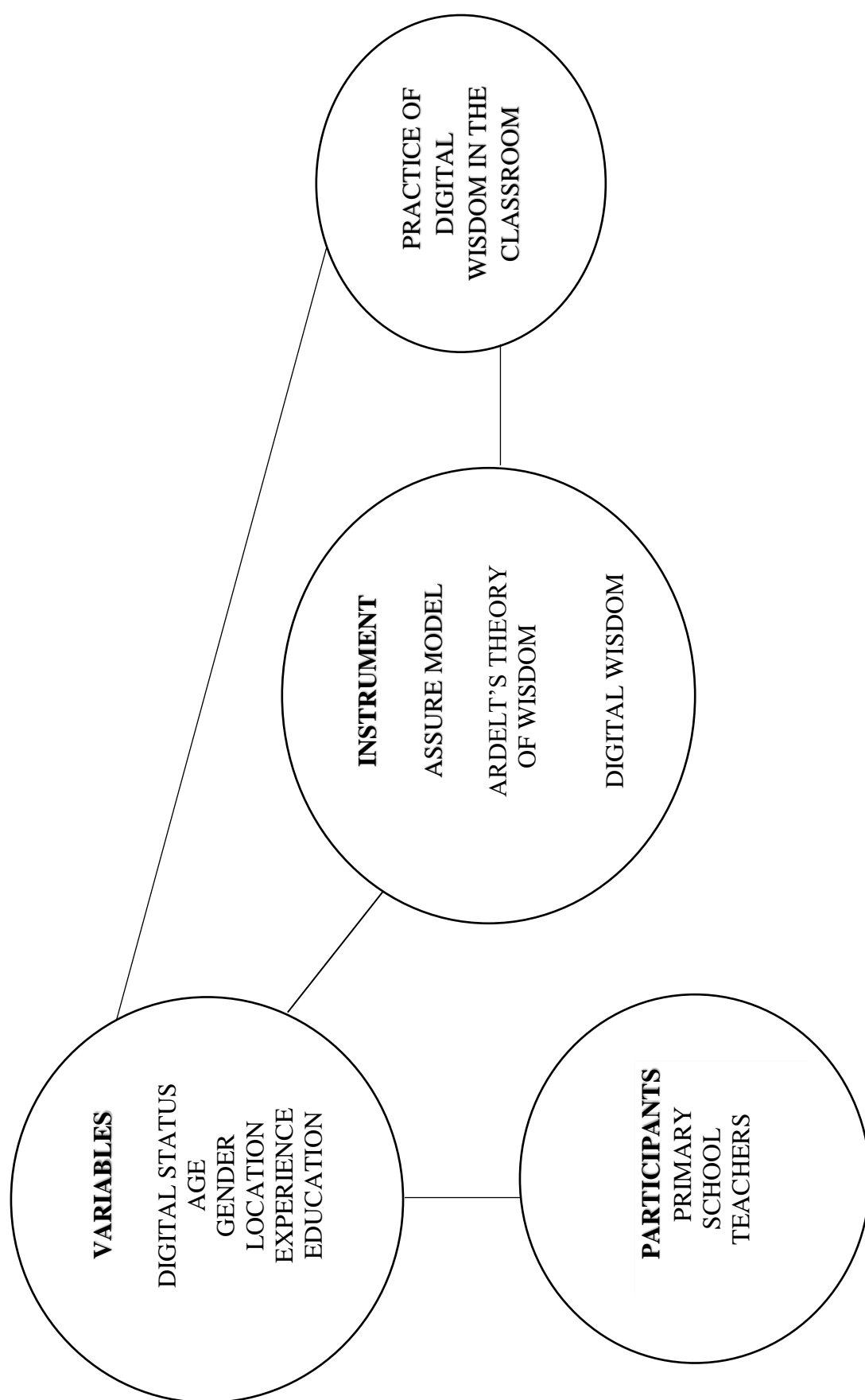
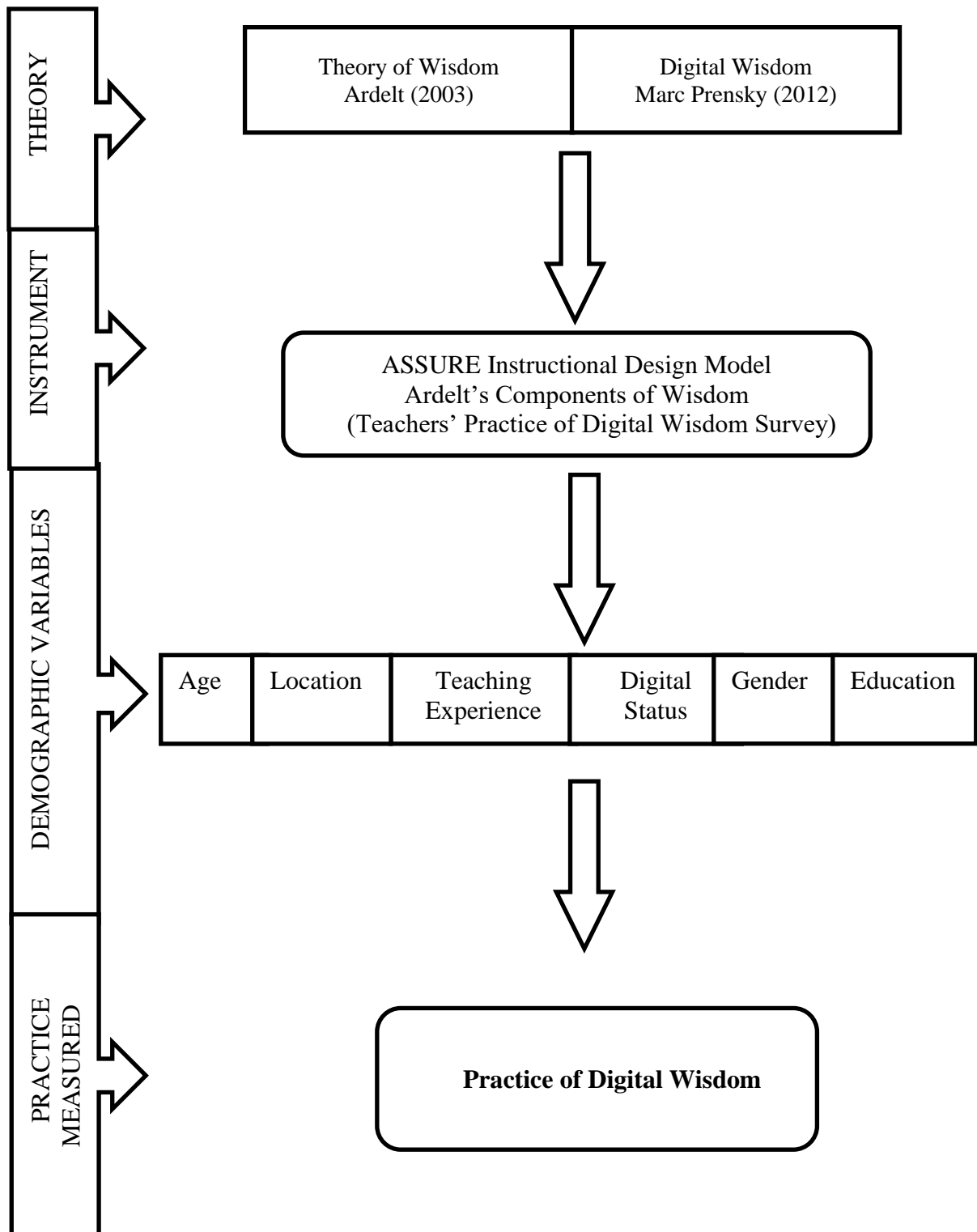


Figure 1.2 Conceptual Framework of the Study

## 1.9 Research Framework



*Figure 1.3 Research Framework for the Study*

Figure 1.3 shows the research framework of the study. The theories are used as guidelines to understand the characteristics of wisdom and digital wisdom. An instrument is developed based on the characteristics. ASSURE model was also used as a ground to develop the dimensions and items in the instrument. The relationships between the practice of digital wisdom and demographic variables were studied using the instrument. Finally, the findings on the practice of digital wisdom are presented.

### **1.10 Significance of the Study**

The findings from the present studies have important implications for the design of digital technology supported learning environment. Literature supports that digital wisdom as having a strong positive impact on students' perceptions of their learning experiences. As such, teachers of digital technology learning environment should focus on attaining digital wisdom to provide an engaging learning experience for students who are digital natives who demand challenging and less boring digital learning content.

Literatures support the use of digital wisdom in pedagogical roles as one way of supplementing to students who lack the interest in learning and are resistant towards digital based lessons. As such the findings of this study will contribute to the field of digital learning by addressing issues surrounding the availability of instructions that engage digital technology. Significantly, the question that may be answered through this research is if teachers today are lacking in digital wisdom. It is crucial to know as because if they are lacking in digital wisdom the vision of our Ministry of Education towards 21<sup>st</sup> century learning may not be achieved.

The research on digital wisdom among the primary school teachers is still scarce in Malaysia. Furthermore, the findings of this study are expected to provide guidelines on how to encourage the teachers to practise digital wisdom so that they are able to improve the quality of their teaching and learning content. This would in return satisfy the needs of the students who are digitally natives as they are easily bored.

Correlational study using the demographic variables will be able to provide insights on their possible relationships with the teachers' practice of digital wisdom. The results yield can be used to the benefit of the teachers in training or in service.

It is essential to move away from the regular drill and practise tutorial programs in classroom and adapt to much more fulfilling digital based learning. Therefore, new aspects such as digital wisdom is worth studied and researched as it will uncover new possibilities that makes learning using digital technology is more effective.

### **1.11 Limitations of the Study**

An obvious limitation in the present study would be: -

- a. Articles and other literatures in research databases in regards of Digital Wisdom are few.
- b. Study is conducted locally. (State of Penang, Malaysia)

## **1.12 Operational Definitions**

### *Wisdom*

In this study wisdom is defined as ability to make sound judgment that leads to common good. (Baltes and Staudinger, 2000)

### *Digital wisdom*

Digital wisdom is also a twofold concept, referring both to wisdom arising from the use of digital technology to access cognitive power beyond our innate capacity and to wisdom in the prudent use of technology to enhance our capabilities. (Prensky, 2012a). In this study digital wisdom is referred as ability to make prudent use of technology to enhance oneself cognitively and beyond innate capability.

### *Digital Immigrant*

Palfrey (2010) pointed out that digital natives were born after 1980. Therefore, in this study, digital immigrants are referred to individuals who were born before 1981.

### *Digital Natives*

According to Palfrey (2010) they were born after 1980. In this study, it is referred to individuals who were born after 1980

### *Digital Skills*

In this study, it is referred as the ability to manage data and information, communicate, make transactions, design, create and carry out problem solving using digital technology.

### *Digital Technology*

In this study, it is referred to as social media, internet, mobile phone and other devices that could be used to aid in teaching and learning in primary school classroom.

#### **1.13 Summary**

The advancement in digital technology has suggested a new paradigm for teaching and learning. Along with this advancement, came the challenges related to the integration of digital technology and resources in teaching and learning such as facilities, digital divides, suitability of resources, lack of digital skills etc. Digital wisdom has been identified by Prensky (2009) as an important element that must be harnessed to overcome the challenges. This study intended to contribute to the literature the relationship between the selected demographic variables such as age, teaching experience, digital status, education level, gender, and locality and digital wisdom of primary school teachers.

The preceding paragraphs in this chapter outlined the research in detail. First, the background of the study describes the issues that arise when digital learning is required to be included into the school syllabus. Secondly, the presentation of the problem statement was associated with the effort to discover the level of practice of digital wisdom among teachers. This will then help us to understand the factors that contribute to the practice of digital wisdom among primary school teachers. Following this, methods employed, research objectives, research questions and hypotheses were reviewed. A brief discussion on the supporting theories was also given. Lastly, the significance and the limitations of the study are discussed.

The rest of this thesis is organised as follows; (i) Chapter two provides critique of the literature in regards of this research and the underpinning theories, (iii) Chapter 3 describes the design of the study, sample selection, instrumentation, procedure and processes of statistical analysis done in the pilot study, (iv) Chapter four reveals the findings of the study and (v) Chapter 5 concludes the study with a summary, discussion and recommendations.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter consists of relevant literature drawn from several disciplines and sources. It is structured around the importance of digital wisdom in teaching and learning in today's classrooms. It also includes other related issues that could picture the importance of digital wisdom among the teachers today.

The first section reviews researches done on evolution in learning which will lead us to understand why and how learning in the classroom has become digitalized. As education has experienced evolution, the following part of the review will discuss on educational resources which was once scarce and now can be found in abundance. The following section will relate on how digital learning has been embedded to the curriculum of teachers' pre-service training. The review is crucial to analyse the changes in the teachers' pre-service training which is towards digital learning, it also involves components of problem solving which could enhance the trainee's digital wisdom. The fifth section of the study discusses on how digital learning has been integrated in the current education system. Information on this allows us to know how well it has been integrated and the expectations the policy makers have on the educators in implementing technology integrated lessons. This section will also narrate on how curriculum in education has become digitalized as current education system emphasizes 21st century learning. The sixth section of the review will then discuss about challenges that occurs in digital learning classroom and how teachers are responding to such challenges. This information is crucial as it gives the idea of the level of digital wisdom possessed by current day teachers. The seventh section

discusses the roles played by teachers as the practitioners of digital wisdom in the classroom. This section will relate ways digital wisdom can be utilized by the teachers while conducting lesson that involves digital learning as the way students learn today has changed. In the following section of the study will relate on the core element of this research which is digital wisdom and its significance in current age education system. In the ninth section, instructional practices in regards to digital wisdom are discussed. The following section highlights the differences between digital wisdom and digital cleverness. It is crucial to know the differences as these concepts can be easily confused. The ensuing section will relate on issues surrounding the digital status (digital immigrants and digital natives) as currently most teachers who are digital immigrant are dealing with students who are digital natives. This section is also important as it serves important pointers to why digital wisdom must be gained by the teachers. In the eleventh section of the study, the absence of digital wisdom among educators will be explored and the following section will highlight ways in which teachers are lacking in skills of using digital wisdom and the scenarios that takes place in effect to that. In the fourteenth section, importance of digital wisdom in encouraging digital citizenship is also discussed. Discussion of digital citizenship is important as we can study how digital wisdom can be used to enforce digital citizenship. Theories in regards of wisdom are also discussed in the subsequent section. The following section of this literature review will discuss on previous researches that have been carried out pertaining to wisdom, technology skills of the teachers and integration of digital tools in instructions. Research gap pertaining to this research topic will also be related in the final section. This chapter is then concluded with a summary.

## **2.2 Revolution in Educational Resources Leading to Digital Learning.**

Education system which used learning methods that employed memorization and rote learning has now transformed. Information and Communication Technology (ICT) which is a big part of digitalised learning component has become a part of education that require all the field players in the field of education such as teachers, students, parents, administrators and education policy makers to be fully involved in their role towards digitalized education.

Hernes (2002) stated that digitalised component such as ICT is a revolution in learning, and there were many changes in methods of learning, the way schools operates, investment and expenditure of resources and our perceptions on opportunities that current education can offer. This digitalised transformation in education has also benefited the parents as they can now log on to school achievement websites or portal provided and look into their children's achievement and progress. In Malaysia, this move is resulted from the Malaysian National Key Result Area (2009) which intended to improve the students' outcomes in education hence to create a highly skilled and educated workforce in the country.

Since digitalized educational resources have become vital, questions relating to equity were raised. Hernes (2002) questioned the issue of equity pertaining to digital technology in two scopes; i) equitable access of digital learning resources for students as consumers, where the poorer people and nations are put at a disadvantage; and ii) equitable provision of digital content, where the poor are even worse off. The question of equity is important in this research as it creates a digital divide. Some schools in Malaysia may not afford to install required learning packages as they are very expensive to buy. Ghavifekr et al. (2015) pointed out that

ICT facilities provided in some schools are not well functioning and in not a good condition and there is no establishment to make sure the facilities are well taken care by the school's management. This would need the teachers to look for alternative solutions to compensate such shortcoming. Teachers need to use digital wisdom to figure out similar learning resources that could help to achieve the objectives of their teaching and learning in their classroom.

Hernes (2002) also suggested that the potential of digital tools in education will take time to be discovered as technology itself is changing and continues to expire. The fact that the technology is always changing, and digitalised gadgets used in teaching and learning would quickly become out-dated; this situation can be bothersome to both learning institution administrators and teachers. Therefore, teachers must be encouraged to gain digital wisdom to keep up with the situation where their students are faster than them in adapting to modern technologies. Teachers should be able to use their digital wisdom in making sound decisions in planning a lesson that will suit their students who are already familiar and well versed with current digital tools.

### **2.2.1 Digital Learning in Malaysian Education System**

Our policy makers also have gone to great length to make sure that we are also not left out in the advancements made in education. Although for many years blackboards and textbooks have been very useful and at times projectors and LCD have been used, we have now entered an age where digital learning tools have made its way into the classroom.

Leow et al. (2016) pointed out that Ministry of Education has produced a new National Education Blueprint in 2011. It is to improve quality of learning throughout

Malaysia that accommodates internet access and virtual learning environment such as 1BestariNet to 10000 schools. Umar and Yusoff (2014) indicated that the Ministry of Education has allotted big amount of money to equip the schools with facilities pertaining to digital technologies. As a result, Malaysia together with the rest of the world utilise textbooks in the form of e-books.

According to the Education Minister Datuk Seri Mahdzir Khalid (The Star Online, 2016) the issue of hardware and connectivity has been solved as most schools have PCs or Google Chromebooks with high speed Internet access. Chromebooks have been provided to schools in order to facilitate digital learning in the classroom. Furthermore, YTL Communication has been appointed to provide high speed internet connections to schools under 1Bestarinet projects. Ministry of Education (2010) indicated that the education system has put interactive IT as the essence of teaching and learning and also in most aspects of its administrative management.

Despite all these provisions, an important element that mostly guarantees success of implementation would be the teachers. Therefore, it is significant for the teachers to be made aware the importance of having sound computer skills as well as digital wisdom to fulfil the demands and objectives set by our education ministry.

### **2.3 Digitalised Educational Resources: From Scarcity to Abundance**

Over the years there have been significant changes in education. These changes are more significant with the availability of information technology. We have moved from scarcity to abundance in digitalised information and learning resources. Teaching and learning is currently taking place anytime and anywhere

with the availability of the digital learning resources. This means the barriers of access to digitalised information and learning resources have been lifted.

According to Smith (2011) technology that provides abundant information is underutilised. A person enhanced with digital wisdom would be able to seize opportunity to harness the abundance and fully utilise it. Lack of sufficient digital wisdom may cause teachers taking the abundance of resources for granted. Weller (2011) stresses that when 'goods' become digitalised and can be obtained from the internet, scarcity is no more an issue. For example, when a copy of data or document is printed, it is still available for others to get a copy of it too. As a result of this abundance, there was a major shift in education as well. Weller (2011) however questioned if we have developed the appropriate teaching and learning approaches using these abundances.

With ever growing online networks, Stewart (2015) states that new ways of academic connections, communication and collaboration emerges. It was also indicated that prior to digital era, knowledge was scarce, and books were costly to obtain. With such positive shift, it would only be useful if teachers are willing to adapt the technological aspects into their instructions. Prensky (2012a) highlights that digitally sophisticated person would be constantly updated with new information. This means a digitally wise teacher would know current resources or technology tools that can be used to conduct effective instructions in the classroom. Prensky (2012b) mentioned that familiarizing to new methods of teaching especially to children living in the 21st century is a challenge and requires digital wisdom.