Teachers' Levels of Knowledge and Readiness in Integrating 4IR Technologies: The Primary ESL Classroom Context

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Abstract. Students' language performance as well as their educational development are affected by English as a second language (ESL) teachers' ability to integrate technologies into their teaching practices. It is therefore necessary to assess teachers' levels of knowledge and readiness in integrating Fourth Industrial Revolution (4IR) technologies into their teaching practices. This paper assesses ESL teachers' levels of knowledge and readiness in integrating 4IR technologies into their teaching practices. Two variables were used to form research questions: ESL primary teachers' (1) level of knowledge and (2) level of readiness. A quantitative research design was employed in this research involving 306 respondents. The findings of the research indicated that teachers' levels of knowledge and readiness influence their integration of 4IR technologies into their teaching practices. Teachers should acquire knowledge regarding 4IR technologies to ensure that they are able to meet the demands of the present education system as well as to help their learners become more proficient in learning the English language. In conclusion, the integration of 4IR technologies is an important aspect that needs to be utilized in teachers' teaching practices.

Keywords: English language learning; fourth industrial revolution; knowledge level; readiness level; malaysian teachers

1. Introduction
At present, numerous methodologies are used to enhance the process of teaching and learning (e.g. through e-learning, e-books, and blogging) due to the emergence of the Fourth Industrial Revolution (4IR). Expeditious transformations have been observed across different sectors, including the education sector. The 4IR has led to a reduction in the use of traditional teaching methods. Predictions have been made that there will be more changes to teaching and learning methods (Hussin, 2018), explaining the need to develop new educational programs to meet

future demands that seem to be bleak and uncertain. At the same time, the emergence of Education 4.0 has also caused English to become a preferred medium of instruction (Hariharasudan & Kot, 2018). In fact, there are claims that the implementation of technology in the teaching and learning process has been inspired by the use of English as a medium of instruction (Anggraeni, 2018).

The 4IR is responsible for changing not only users' way to implement actions but also their identity, since the 4IR evolves exponentially fast, thus affecting the entire educational system (Oosthuizen, 2016). On that account, knowledge and readiness in integrating 4IR technologies into teaching practices are important to teachers. Razak et al. (2018) concurred with this, recommending teaching skills that meet the present global demands, where teachers need to ensure that their knowledge, understanding, and readiness are aligned with the current economics. However, in this regard, scholars (Ahmad et al., 2019; Aprianti & Sahid, 2020; Erboz, 2017; Hussin, 2018; Lawrence et al. 2019) have posed certain common questions: Do people understand the 4IR? Are they, especially teachers, ready to integrate 4IR technologies?

There is an urgency to compel English as a second language (ESL) teachers to be commonly aware of the function of the language as an enabler to compete rigorously at the international level. In fact, Woolf et al. (2013) asserted that teachers need to possess 21st century skills as pre-requisites for transforming any educational system. These skills include cognitive, intrapersonal, and interpersonal skills (Naim & Razak, 2020). In lieu of that, teachers need to be ready to integrate 4IR technologies into their teaching practices. Hussin (2018) emphasized that teachers need to relearn these skills in preparation of the 4IR developments as part of aligning with the future demands. In other words, teachers, specifically ESL teachers, must be equipped with knowledge and skills in technology as well as 4IR elements to ensure that learners can efficiently acquire English. To address this problem, we formulated two research questions:
1. To what extent does ESL primary teachers' level of knowledge of the 4IR help them to integrate 4IR technologies into their teaching practice?
2. How does ESL primary teachers' level of readiness affect their integration of 4IR technologies into their teaching practice?

As such, the hypotheses for this research are:
1. There is a significant relationship between ESL teachers' level of knowledge in integrating 4IR technologies into their teaching practices in an ESL classroom context.
2. There is a significant relationship between ESL teachers' level of readiness in integrating 4IR technologies into their teaching practices in an ESL classroom context.

2. Literature Review
2.1 The Fourth Industrial Revolution
The 4IR focuses on devising smart conditions and technological advancements that can enhance capabilities for humans and machines to simplify the daily workload. In education, elements of the 4IR that facilitate teaching and learning

processes are autonomous robots, simulation, cloud computing, system integration, the internet of things (IoT), cyber security, 3D printing, augmented reality (AR), big data, and analytics (Erboz, 2017). As such, 4IR technologies help humankind in many ways, such as use of autonomous robots that are able to help with the solving of complex tasks, especially in manufacturing industries.

2.2 The Fourth Industrial Revolution in Education
Since technology is integrated into the process of teaching and learning daily, teachers need to know how to integrate it into their teaching practices (Aprianti & Sahid, 2020; Hariharasudan & Kot, 2018; Naim & Razak, 2020; Ramli et al., 2020). As such, it is important for teachers to be vigilant with and conscious of the advancements in technologies that are spurred by the 4IR as an effort to stay relevant and future-ready in serving the community.

The 4IR is beyond a technology-driven revolution, with the clear objective of impacting many sectors in society positively, including the education sector. For education, 4IR emergence has been considered to cause a transition from traditional teaching to digital teaching in the 21st century, where laptops, holograms, social media, and artificial intelligence are important educational tools in school, especially in ESL classrooms. Hashim (2018) postulated that mobile phones, smartphones, tablets, laptops, or netbooks are used by ESL learners for downloading and uploading purposes or doing online work, irrespective of time and place.

2.3 Integration of the Fourth Industrial Revolution in ESL Primary Classrooms
ESL teachers need to be aware that the integration of elements of the 4IR, such as multimedia technology, is necessary in second language acquisition (SLA). Bull and Ma (2001) stated that technology helps to supply unlimited resources in language learning among learners. This has led to many research studies investigating the effects and advantages of using technology in SLA or language learning (cf. Hashim et al., 2019; Ilias & Aladin, 2019; Razak et al., 2018; Yunus 2018), which has proven that language learning can be efficiently improved by using technology. This is because technology provides teachers with many opportunities to improve their teaching practices, eventually leading to a better learning environment.

Nowadays, changes are inevitable as technologies are rapidly developed to meet the demands and needs of the 4IR. Hence, teaching approaches also need to be changed, with Pazilah et al. (2019) implying that teaching approaches and methods will also change over time. Yunus (2018) also agreed that education, especially in Malaysia, is also changing with technologies beginning to be implemented in classrooms where projectors, laptops, and wireless internet are used. Similarly, ESL classrooms also witness the use of technologies, where multimedia and social media are used as a medium to teach English. Teachers and educators are also resorting to cloud computers, which is one of the elements of the 4IR, to store information or share it with their learners. Besides it being a better means to share resources, software, and information since it is an internet-based-computing platform, cloud computing is also flexible and offers

new prospects for teachers to improve the process of teaching and learning (Hashim, 2018).

2.4 ESL Teachers' Levels of Knowledge and Readiness in Integrating 4IR Technologies

There are many research studies on knowledge and readiness to embrace the 4IR in education (cf. Ghazali, 2020; Hizam-Hanafiah et al., 2020; Junid et al., 2019; Lapammu & Mahamod, 2018; Mpungose, 2020; Razak et al., 2018; Romy et al., 2019). These research studies focused on the levels of knowledge and readiness among teachers and learners as an effort to integrate 4IR technologies into the process of teaching and learning. Opinions on knowledge to embrace the 4IR are divided. Lapammu and Mahamod (2018) believed that learners are able to improve their language acquisition as well as enhance their skills in using computers and the internet to find their learning material independently. Nonetheless, Romy et al. (2019) found that trainee teachers need more practice to improve their 4IR knowledge since their knowledge is moderate. On the other hand, Razak et al. (2018) discovered regarding teacher readiness that teachers should attend training programs that can help them to improve their technological skills. A systematic review by Hizam-Hanafiah et al. (2020) revealed that there are two angles in 4IR readiness models: (1) applicability of readiness model, and (2) investigation on users' readiness by using readiness models. However, most of the research on readiness models are considered intellectual property and none has been publicized, causing a research gap in this specific area (Hizam-Hanafiah et al., 2020). These researchers indicated that levels of knowledge and readiness in integrating 4IR technologies into the teaching and learning process have been carried out at different levels of education at learner or teacher level.

2.5 Technology Acceptance Model 3

This research is based on the theoretical framework proposed by Avelino and Ismail (2021) derived from the technology acceptance model (TAM) 3 (see Figure 1).
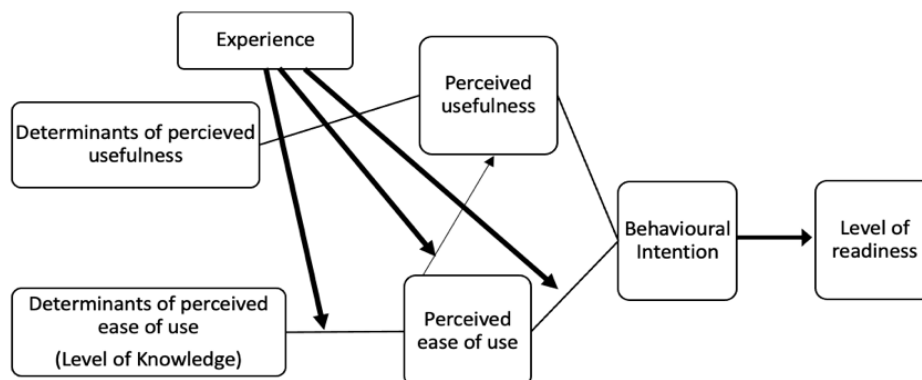

Figure 1: Theoretical framework (Avelino & Ismail, 2021)

Venkatesh and Bala (2008) proclaimed that TAM3 can be used to present a complete nomological network of the determinants on how individuals adopt and

utilize technologies. TAM3 was developed based on a merger of TAM2 with the model of the determinants of perceived ease of use. The focus of TAM2 is to present two theoretical processes, (1) social influence and (2) cognitive instruments, that can affect the various determinants of perceived usefulness and behavioral intention (Venkatesh & Davis, 2000). This is in contrast with TAM3, with Venkatesh and Bala (2008) claiming that the determinants of perceived usefulness and perceived ease of use will not affect each other.

Other than that, TAM3 also proposes that experience will moderate three relationships not empirically tested in TAM2: These are: (1) perceived ease of use and perceived usefulness, (2) computer anxiety and perceived ease of use, and (3) perceived ease of use and behavioral intention (Venkatesh & Bala, 2008). Based on TAM3, perceived ease of use will affect perceived usefulness more when users' experience increases. This is because users will be able to gauge their own capability to achieve high-level goals with information they have gathered from their experience. This also affects users' computer anxiety on perceived ease of use, as they will be less anxious when they have had more experience in utilizing technologies. Hence, as users familiarize themselves with technologies, they feel that perceived ease of use is less important and behavioral intention will fade into the background. Consequently, they are able to form behavioral intention without being affected on how they perceived ease of use in utilizing technologies. Therefore, for this study, we use the theoretical framework based on TAM3 to assess the levels of knowledge and readiness in integrating 4IR technologies into teaching practice among ESL primary school teachers.

3. Methodology
3.1 Research Design
This research is descriptive research due to its ability to describe trends of the 4IR without any influence from the researcher (Faryadi, 2019) in a simple and understandable language. In line with the research aim, which is to explore ESL teachers' levels of knowledge and readiness in integrating 4IR technologies, we employed a quantitative approach. Since the 4IR is a current phenomenon trending in the education sector, the use of a descriptive design helped to elicit data concerning the 4IR among ESL teachers. Thus, as this research employed a quantitative approach, we decided to use a descriptive design to gather the required information.

3.2 Research Sampling
A good sample should represent the entire population of the research (Brown, 2006). We identified 1526 ESL teachers (including English option and non-option teachers) in 74 primary schools in Pasir Gudang, Johor – a state at the southern part of Malaysia. Upon referring to Krejcie and Morgan's (1970) sample size determination table, sample selection was carried out using stratified random sampling. Initially, 417 respondents completed the questionnaire, of which only 306 (M = 110; F = 196) were selected for data analysis. Table 1 provides the age ranges of the respondents.

Table 1: Respondent age ranges

Age	Frequency	%
20 – 30 years old	94	31
31 – 40 years old	160	52
41 – 50 years old	44	14
51 years old above	8	3
Total	306	100

Table 2 summarizes the teaching experience of respondents in teaching ESL, which was the main criterion in selecting the sample for this research. Of the 417 initial respondents who completed the questionnaire, 313 (75%) were English option teachers, while 104 (25%) were English non-option teachers.

Table 2: Respondents' English language teaching experience

Years of teaching English	Frequency	%
1 – 5 years	57	18
6 – 10 years	152	50
11 – 15 years	64	21
16 years and above	33	11
Total	306	100

3.3 Research Instrument

The data collection instrument used in this research was a 35-item questionnaire, which was adapted from TAM3 constructs (Appendix 1). All the items have been validated by Venkatesh and Bala (2008), who analyzed TAM3. Three major TAM3 constructs, namely (1) perceived ease of use, (2) perceived usefulness, and (3) behavioural intention, were operationalized using items adapted from Davis (1989) and Davis et al. (1989).

Section A consisted of five items that elicited the demographic information of respondents. Respondents had to indicate their gender, age, teaching experience, teaching option, and prior knowledge of the 4IR. Section B consisted of items on (1) perceived usefulness and (2) subjective norms on teachers' levels of knowledge and readiness of the 4IR. Lastly, Section C consisted of items on perceived ease of use and its determinants. Sections B and C included items measured with a 5-point Likert scale, with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

3.4 Data Collection Procedure

This research was conducted after having obtained permission from the Ministry of Education (MoE) Malaysia, through the Research Application System (eRAS), and from Johor State Education and Pasir Gudang District Education. Final approval was obtained from the identified participating school administrators before proceeding with data collection. Subsequently, we contacted English head panels from the schools via online platforms to share the link for the survey. We gave respondents one month to complete the questionnaire before collecting the questionnaire. We distributed questionnaires to 1526 ESL primary school teachers. However, only 417 teachers (27%) completed the questionnaire, despite numerous reminders being given. The remaining teachers refused to participate, which is the main reason for the small number of respondents. This number barely qualifies for the minimum number of respondents needed to represent the population. Of the 417 respondents, only 306 were selected based on Krejcie and Morgan's (1970) sample size determination table.

3.5 Data Analysis

Since this research employed a survey design, the data obtained were analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 26. Descriptive analysis was used to describe and summarize data, which included measures of frequency, percentage, central tendency (mean), and mean scale. In this study, descriptive analysis was used to describe the demographic profile of the respondents and the responses received for Section C, which consisted of items on perceived ease of use and its determinants. The descriptive analysis was used to answer the second research question. Furthermore, inferential analysis was used to answer the first research question. We also used one-way analysis of variance (ANOVA) to investigate to what extent teachers' level of knowledge helps them to integrate 4IR technologies into their teaching practices.

4. Findings and Discussion

4.1 Level of Knowledge

Five categories were used to gauge the respondents' level of knowledge regarding the 4IR, namely (a) nothing, (b) little, (c) something, (d) a lot, and (e) fully understand (Table 3). This helped to provide an answer to the first research question in response to the dependent variable of respondents' level of knowledge.

Table 3: Respondents' level of knowledge of the Fourth Industrial Revolution

Level of knowledge	Frequency	%
Nothing	48	16
Little	125	41
Something	113	37
A lot	15	5
Fully understand	5	1
Total	**306**	**100**

As seen in Table 3, 48 respondents (16%) knew nothing about the 4IR, compared to the 5 respondents (1%) who fully understood the 4IR. The majority of the sample (125; 41%) reported that they knew a little about the 4IR, followed by 113 respondents (37%) who knew something about the 4IR. The last 15 respondents (5%) knew a lot of things regarding the 4IR. This shows that most teachers know a little about the 4IR, reiterating Romy et al.'s (2019) concern for the lack of knowledge on the 4IR among Malaysian ESL teachers.

4.2 ESL Primary Teachers' Level of Knowledge in Integrating 4IR Technologies
Data gathered were analyzed using inferential analysis to identify the relationship between the independent and dependent variables. Whereas the independent variable is teachers' integration of 4IR technologies into their teaching practices, the dependent variables in this research are teachers' (1) level of knowledge and (2) level of readiness in integrating 4IR technologies into their teaching practices.

Before conducting the inferential analysis, we carried out a normality test to choose which type of t-test to use to analyze the data (Creswell, 2012). Based on the normality of data, parametric statistics is used to analyze normal data, while non-parametric statistics is used to analyze abnormal data (Cohen et al., 2018). Mishra et al. (2019) emphasized that data should be normally distributed to represent the data since the wrong selection of data might give the wrong interpretation. Distribution of data for this research was determined using the Kolmogorov-Smirnov test (K-S test), where the normality of data in this research was tested through skewness and kurtosis values, a histogram, and a Q-Q graphic plot.

The sample chosen in this research included more than 300 respondents, hence the need for the use of a histogram and the absolute values of skewness and kurtosis (Kim, 2013). Any absolute skewness value larger than 2 or an absolute kurtosis value larger than 4 can be used as reference values for determining the normality of data collected (Mishra et al., 2019). The skewness values for all variables in this research were between -2 and 2, while the kurtosis values were between -4 and 4, indicating that data distribution was normal.

After conducting the normality test, a one-way ANOVA was performed to investigate if the respondents' level of knowledge helped them to integrate 4IR technologies into their teaching practices. Significance is indicated with a p-value of 0.05, with $p > 0.05$ indicating the test is significant, while $p < 0.05$ indicating the test is insignificant. When the test is insignificant, this means that the respondents' level of knowledge of integrating 4IR technologies does not help them to integrate 4IR technologies into their own teaching practices.

The ANOVA results revealed that perceived ease of use is affected by the respondents' level of knowledge in the integration of 4IR technologies into their teaching practices ($F[4, 301] = 42.932$, $p = 0$). This therefore shows that different levels of knowledge do affect teachers' integration of 4IR technologies into their teaching practices. This aligns with Romy et al. (2019), who suggested that teachers must possess the knowledge and pedagogical skills needed so they can

utilize technologies in their teaching practices to meet the demands and needs of the 4IR.

Regarding computer self-efficacy, the ANOVA results showed that the respondents' level of knowledge did not affect their computer self-efficacy (F[4, 301] = 15.557, p = 0). This also shows that the respondents' different levels of knowledge affect their motivation, cognitive skills, as well as behavior in integrating 4IR technologies into their teaching practices. Furthermore, for perception of external control, the ANOVA test yielded the following value: F(4, 301) = 15.29, p = 0. The second hypothesis is therefore rejected. The findings of Lapammu and Mahamod (2018) can also be applied to teachers. These researchers found that learners were able to improve their language acquisition and usage of technology independently because they possessed knowledge on it.

However, the ANOVA test yielded a significant value (more than 0 but less than 0.05) for computer playfulness (F[4, 301] = 4.416, p = 0.002). This finding also supports rejection of the second hypothesis. This shows that teachers' level of knowledge contributes to their improvement in computer playfulness. Mpungose (2020) concurred with this, claiming that teachers who do not have any notion of advanced knowledge to integrate 4IR elements are unlikely to improve their skills in integrating 4IR elements even though they have a good level of knowledge on standard content, pedagogy, and technology.

The ANOVA result for computer anxiety indicated support for the rejection of the second hypothesis with its value (F[4, 301] = 4.1, p = 0.003). This also showed that the respondents with a good understanding of 4IR technologies felt less anxious in using computers when integrating 4IR technologies into their teaching practices and vice versa. Besides that, perceived enjoyment showed the following value through the ANOVA test: F(4, 301) = 21.673, p = 0), also supporting rejection of the second hypothesis. Hariharasudan and Kot (2018) indicated that when teachers are able to induce joy in learners' learning, learners will be able to pay attention and learn better, a finding also applicable to teachers.

In conclusion, the ANOVA test showed that all variables supported rejection of the second hypothesis. The findings indicated that level of knowledge affected respondents' integration of 4IR elements into their teaching practices.

4.3 ESL Primary Teachers' Level of Readiness Affects Their Integration of 4IR Technologies

Frequency, percentage, mean, and mean scale were used to measure and analyze the data of the descriptive analysis. The mean score was measured by using the interpretation by Nunnally and Bernstein (1994), as shown in Table 4.

Table 4: Nunnally and Bernstein's mean score interpretation table

Mean scale	Level
1.00 – 2.00	Low

2.01 – 3.00	Medium low
3.01 – 4.00	Medium high
4.01 – 5.00	High

4.3.1 Perceived usefulness

Table 5 shows the descriptive data on the perceived usefulness of integrating 4IR technologies into teaching practices. There are four items in this section that measure how the respondents perceived the usefulness of integrating 4IR technologies into their teaching practices.

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Table 5: Perceived usefulness

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Item no.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Mean scale
1	I think technology of 4IR improves my performance as an ESL teacher.	0 (0%)	0 (0%)	67 (22%)	202 (66%)	37 (12%)	4	Medium high
2	I find using technology of 4IR in my job increases my productivity as an ESL teacher.	0 (0%)	2 (1%)	68 (22%)	195 (64%)	41 (13%)	4	Medium high
3	I find using technology of 4IR enhances my effectiveness as an ESL teacher.	0 (0%)	2 (1%)	68 (22%)	193 (63%)	43 (14%)	4	Medium high
4	I find integration of 4IR is useful for me as an ESL teacher.	0 (0%)	2 (1%)	45 (15%)	191 (62%)	68 (22%)	4	High
Overall							4	Medium high

Table 5 shows that the mean scale for Item 1 (*I think technology of 4IR improves my performance as an ESL teacher*) was medium high, with 202 respondents (66%) agreeing and 37 (12%) strongly agreeing with the statement. None disagreed or strongly disagreed with the statement, while 67 (22%) were neutral about it. Based on this data, most respondents agreed that the integration of 4IR technologies into their teaching practices improved their performance as ESL teachers. This finding aligns with Ramli et al. (2020) and Hashim (2018), who argued that classroom

activities and language learning processes can be enhanced by using technology. Findings further proved that the integration of 4IR technologies into teachers' teaching practices helps them to improve their teaching performance.

The mean scale for Item 2 (*I find using technology of 4IR in my job increases my productivity as an ESL teacher*) was also medium high, with 195 respondents (64%) agreeing with the statement. The respondents thus acknowledged that 4IR technologies help increase their productivity as ESL teachers. Productivity can be enhanced through the many uses of gadgets available at present, such as tablets, smartphones, and laptops, which allow quick access to work despite the teachers' whereabouts (Hashim, 2018).

For Item 3 (*I find using technology of 4IR enhances my effectiveness as an ESL teacher*), the mean scale was also medium high, with the majority of the respondents either agreeing (193; 63%) or strongly agreeing (43; 14%) that 4IR technologies enhance their effectiveness as ESL teachers. In earlier research, Naim and Razak (2020) indicated that teachers with high digital competency are able to have a positive impact on learner achievement in school because they are able to manage technology-rich environments better.

Item 4 (*I find integration of 4IR is useful for me as an ESL teacher*) had the highest mean scale. It measured the usefulness of 4IR technologies for respondents as ESL teachers, where 191 respondents (62%) agreed and 68 strongly agreed (22%) with the statement. They thus agreed to the usefulness of integrating 4IR technologies as an ESL teacher. It is interesting that only a small fraction either disagreed (2; 1%) or remained neutral (45; 15%) with the statement. This finding is echoed by Golonka et al. (2014), who found that learners are able to engage better in the progression of language learning and have more fun when technology is involved. Thus, teachers who utilize 4IR technologies in their teaching practices will find that the technologies are useful for their teaching practices.

To conclude, most respondents agreed with Item 4, as they thought that the integration of 4IR technologies is useful for them as ESL teachers. It also had the highest mean scale among all the items in this section. The emergence of the 4IR has caused technology development to increase greater than before, predominantly in the education sector. This is supported by Hashim (2018), who proclaimed that the use of technologies in the education sector has been escalating. This is because technology provides many opportunities for teachers to improve their teaching practices. Teachers have experienced major changes in the education sector these past few years as a result of 4IR emergence. This finding shows that teachers' level of readiness in integrating 4IR technologies improves their teaching performance as ESL teachers. The results for the determinant of perceived usefulness correspond with research by Junid et al. (2019), who concluded that if teachers felt that the integration of technologies does not improve their job performance, they will feel reluctant to integrate 4IR technologies into their teaching practices.

4.3.2 Subjective norm

Table 6 summarizes the subjective norm of respondents in integrating 4IR technologies into their teaching practices as primary ESL teachers. There are four items in this section measuring the impact of surroundings or norms on respondents' level of readiness in integrating 4IR technologies into their teaching practices.

Table 6: Subjective norm

Item no.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Mean Scale
5	People that influenced my behaviors, such as my colleagues and pupils, think that I should integrate 4IR in my teaching practices as an ESL teacher.	0 (0%)	11 (4%)	74 (24%)	203 (66%)	18 (6%)	4	Medium high
6	People who are important to me think that I should integrate 4IR in my teaching practices as an ESL teacher.	4 (1%)	43 (14%)	167 (55%)	77 (25%)	15 (5%)	3	Medium high
7	My administration and colleagues think that I should integrate 4IR in my teaching practices as an ESL teacher.	2 (1%)	7 (2%)	39 (13%)	193 (63%)	67 (21%)	4	High
8	In general, my school supports the integration of 4IR.	2 (1%)	6 (2%)	28 (9%)	138 (45%)	132 (43%)	4	High
Overall							4	Medium high

As Table 6 shows, the mean scale for Item 5 (*People that influenced my behaviors, such as my colleagues and pupils, think that I should integrate 4IR in my teaching practices as an ESL teacher*) was medium high, indicating that most respondents agreed with the item. The table shows that 203 respondents (66%) agreed and 18 (6%) strongly agreed with Item 5. Only 11 respondents (4%) disagreed with the statement, whereas 74 (24%) remained neutral in their response. This shows that

most respondents agreed that their colleagues and pupils think that they should integrate 4IR technologies into their teaching practices.

For Item 6 (*People who are important to me think that I should integrate 4IR in my teaching practices as an ESL teacher*), results showed that most of the respondents were neutral (167; 55%) regarding the statement. In addition, only 77 respondents (25%) agreed and 15 (5%) strongly agreed with Item 6. To conclude, most respondents were informed by the perception of their immediate circle of influence regarding the importance of integrating 4IR technologies into their teaching practices.

As for Item 7 (*My administration and colleagues think that I should integrate 4IR in my teaching practices as an ESL teacher*), 193 respondents (63%) agreed and 67 (21%) strongly agreed with the statement. Only 7 (2%) disagreed and 2 (1%) strongly disagreed in response to the statement, while 39 (13%) remained neutral. This shows that respondents' working environment provided them with sufficient support to integrate 4IR technologies into their teaching practices. It is therefore incomprehensible if teachers do not integrate technology as a medium of communication in the teaching and learning process (Ahmed & Nasser, 2015). This sentiment is supported by the results of Item 8 (*In general, my school supports the integration of 4IR*). For this item, 138 respondents (45%) agreed and 132 (43%) strongly agreed. Only 6 (2%) disagreed and 2 (1%) strongly disagreed, making up a small fraction in opposition to the statement, along with 28 respondents (9%) who remained neutral.

5. Conclusion

The integration of technology into teaching and learning already started after the Third Industrial Revolution, where teachers' role changed from being the sole informant to a facilitator in helping pupils acquire the knowledge and skills needed. This research therefore aimed to assess ESL primary teachers' levels of knowledge and readiness in integrating 4IR technologies into their teaching practice. Integration of 4IR technologies can be achieved, since 4IR technologies can help to optimize the learning environment for learners. However, researchers have found that most previous research on levels of knowledge and readiness in integrating 4IR technologies focused more on learners and trainee teachers than on teachers currently teaching in school. As such, this research saw the significance of pursuing ESL primary teachers as its population. We hope that this research will pave the way for more research opportunities, since teachers' professionalism and skills are crucial to ensuring better delivery of exceptional teaching quality.

This research has several implications for both teachers and policy-makers. At the teacher level, vast changes are observed in teachers' pedagogy, especially with the change of time and teaching methods. The chalk-and-talk pedagogy is no longer practical, since technology has been integrated into every aspect of daily life. Nowadays, teachers are expected to know how to integrate technology into their teaching practices as a way to ensure that their teaching and learning sessions can be carried out efficiently. New pedagogy in teaching and learning is needed due

to the advancements in digital technologies and the 4IR. This research will also be beneficial to policy-makers in their efforts of reforming a new curriculum that suits both teachers and learners. Such a policy will allow learners to better meet the demands of the 4IR in the future. Furthermore, this finding also provides insights on the current levels of knowledge and readiness of ESL teachers in integrating 4IR technologies, which will assist policy-makers in their implementation of new policies. Thus, future research studies ought to explore these impacts at other levels of education. Such exploration will ensure the success of integrating 4IR technologies in different levels of teaching practices, be it at national or international level.

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Appendix 1

This survey is conducted for a project paper under the Master of Education Programme in Universiti Kebangsaan Malaysia (UKM). The target respondents for this survey are those who are certified as English Language teachers (TESL/TEYL/TOEFL) and is currently teaching the English language subject in primary schools. The questionnaire aims to gain insights on primary school teachers' level of knowledge and readiness in integrating 4IR in their teaching practices. The data accumulated will only be used for academic research purposes. There are 9 main sections in the questionnaire consisting of 35 items. Please try your best in giving an honest response to each item. Rest assured that your kind responses will be treated with confidentiality. Thank you for your cooperation.

SECTION A

Please choose the best answer for each following statement.

1. Gender:

Male	
Female	

Age:

20 - 30	
31 - 40	
41- 50	
50 years above	

English language teaching experiences:

1 – 5 years	
6 – 10 years	
11 – 15 years	
16 years above	

Teaching Option:

English option	
Non English option	

How much do you know about the Industrial Revolution 4.0 (4IR)?

Nothing	
Little	
Something	
A lot	
Fully understand	

SECTION B

For each statement, please select your response.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Part A: Perceived of Usefulness						
No.	Statement	1	2	3	4	5
1	I think technology of 4IR improves my performance as an ESL teacher.					
2	I find using technology of 4IR in my job increase my productivity as an ESL teacher.					
3	I find using technology of 4IR enhance my effectiveness as an ESL teacher.					
4	I find integration of 4IR is useful for me as an ESL teacher.					

Part B: Subjective Norm						
No.	Statement	1	2	3	4	5
5	People that influenced my behaviours such as my colleagues and pupils thinks that I should integrate 4IR in my teaching practices as an ESL teacher.					
6	People that important to me think that I should integrate 4IR in my teaching practices as an ESL teacher.					
7	My administration and colleagues think that I should integrate 4IR in my teaching practices as an ESL teacher.					
8	In general, my school support the integration of 4IR.					

SECTION C

For each statement, please select your response.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Part C: Perceived Ease of Use						
No.	Statement	1	2	3	4	5
9	I am able to use technology and element of 4IR in my teaching practices as an ESL					

		teacher.					
	10	I do not require a lot of mental effort to integrate 4IR in my teaching practices as an ESL teacher.					
	11	I find it easy to integrate 4IR in my teaching practices as an ESL teacher.					
	12	I find it easy for me to teach when I integrate 4IR in my teaching practices as an ESL teacher.					

Part D: Computer Self-Efficacy

No.	Statement	1	2	3	4	5
13	I can integrate 4IR in in my teaching practices as an ESL teacher without any help from others.					
14	I can integrate 4IR in in my teaching practices as an ESL teacher if I have materials and equipment that can help me.					
15	I can integrate 4IR in in my teaching practices as an ESL teacher if someone show me how to do it first.					
16	I can integrate 4IR in in my teaching practices as an ESL teacher if I already used the same technology or elements of 4IR before.					

Part E: Perception of External Control

No.	Statement	1	2	3	4	5
17	I have the ability to control the usage of technology and elements of 4IR in my teaching practices as an ESL teacher.					
18	I have the resources necessary to integrate 4IR in my teaching practices as an ESL teacher.					
19	It will be easy for me to integrate 4IR in my teaching practices as an ESL teacher if I had been given the opportunities, knowledge and resources.					
20	I think integration of 4IR is not compatible with my teaching method as ESL teacher.					

Part F: Computer Playfulness

No.	Statement	1	2	3	4	5
21	I think integration of 4IR in my teaching practices as an ESL teacher make me spontaneous and creative.					
22	I think integration of 4IR in my teaching practices as an ESL teacher make me playful.					
23	I think integration of 4IR in my teaching practices as an ESL teacher make me unoriginal.					

Part G: Computer Anxiety

No.	Statement	1	2	3	4	5
24	Computers do not scare me at all.					
25	Working with a computer make me nervous.					
26	Computer make me feel uncomfortable.					
27	Computer make me feel uneasy.					

Part H: Perceived Enjoyment

No.	Statement	1	2	3	4	5
28	I find using 4IR in my teaching practices as an ESL teacher is enjoyable.					
29	Integration of 4IR in my teaching practices as an ESL teacher is pleasant.					
30	I have fun in integrating 4IR in my teaching practices as an ESL teacher.					