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Foreign language teachers' technological and pedagogical content knowledge: A study with AFL teachers in Indonesia

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Abstract

Teaching-learning of the Arabic language has emerged as vital in both Muslim and non-Muslim countries. However, a lack of studies exists on measuring the technological pedagogical content knowledge (TPACK) of Arabic language teachers. Thus, this study explores Indonesian Arabic teachers' TPACK and provides a conceptualization that the elements of TPACK are not separate; rather, each element facilitates the sustenance of other elements. To achieve this objective, a quantitative research approach is undertaken using a validated and reliable questionnaire. Data is collected from 320 teachers (snowball sampling) using Google forms. The data analysis reflects the inter-relation of the elements of TPACK, with a satisfactory TPACK of the Indonesian Arabic teachers. Additional findings suggest that teachers use technology minimally in designing tasks or even assessments despite their strong technological background. Further studies are recommended to explore teachers' roles, teacher development programs, and religious motivation in achieving higher TPACK of Arabic language teaching.

Keywords: TPACK; Arabic language; language education; technology in tasks; technology in assessment.

1. Introduction

Studies conducted in non-Muslim pluralist societies often raise controversies on the importance of mandatory Arabic language learning (Sai, 2017). However, learning the Arabic language in Muslim communities inevitably impacts from a language acquisition viewpoint and a religious (Islamic) point of view (Wekke, 2017). Contrasting studies even emphasize the need to promote a unified Islamic curriculum for teaching the Arabic language throughout Muslim Nations (Karimizadeh & Abolghasemi, 2016). While studies also show young adults' recognition of Arabic as the language of Islam (Sibgatullina, 2020), some other studies advocate the study of Quran under linguistic studies for simultaneously promoting the learning of Qur'an, language, religion, and science (Ali et al., 2020). Nevertheless, the underlying fact remains that Arabic is considered a substantial foreign language or

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even second language in many countries. Little researches have been conducted on the factors that play in the Arabic teaching-learning environment (Alwaleedi, 2017).

Regardless of the religious or communal impact, any foreign language learning comes with difficulties for both teachers and students (Haggag & Bakr, 2020; Μπουκογιάννη, 2019; Al-khresheh & Al-Ruwaili, 2020; Al-khresheh, 2020; Alkodimi & Al-Ahdal, 2021). The Arabic language has more complex morphological and syntactic systems than any other European language, including English (Alwaleedi et al., 2019; Wahba et al., 2017), which makes the teaching and learning of Arabic even more challenging for the teachers and learners. Several studies indicate the students' difficulties while learning Arabic, either as a second language or a foreign language (Al-busaidi et al., 2016; Amer, 2020; Zurqoni et al., 2020). The reasons behind these difficulties range from lack of vocabulary, formation of verbs in the Arabic language, even inadequate environmental support, and lack of opportunity to practice Arabic outside the classroom (Zurqoni et al., 2020).

In addressing students' learning difficulties, the constructivist theory of education advocates teachers' role to facilitate the learning to reach the individual's zone of proximal development (Vygotsky, 1980). Specifically, in bilingual education, where two parallel languages are simultaneously taught to students, educators worldwide call for revolutionizing the traditional pedagogical methods (Schwartz & Asli, 2014). What more could be suggested is embracing new techniques for combining blended learning, online and face-to-face learning in this time of the global pandemic that has affected language teaching as much as any learning (Ahmadi & Ilmiani, 2020). In doing so, researchers have emphasized that teachers' content knowledge (CK) or pedagogical knowledge (PK) separately might not be enough, and there is an urgent need to develop teachers' pedagogical content knowledge (PCK) to teach the Arabic language successfully (Saidah et al., 2018).

However, the massive advancement in technology has taken over education, especially considering that the pandemic situation has established the need to incorporate technological aspects in teaching to ensure smooth conduct of online classes, recorded lectures, assignment submission, etc. (Al Lily et al., 2020; Al-khresheh, 2021; Mahundu, 2020). In terms of language teaching, researchers indicate the importance of technological knowledge (TK) and technological content knowledge (TCK) as integrated aspects of teaching and implementing through pedagogical strategies; hence the need for acknowledging technological pedagogical knowledge (TPK) emerges as crucial (Alharbi, 2019).

The underlying theory behind combining teachers' content knowledge (CK), technological knowledge (TK), pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK), hence the total package was introduced by Koehler and Mishra (2005) Technological Pedagogical Content Knowledge (TPACK) lies on,

'Learning by design appears to be an effective instructional technique to develop deeper understandings of the complex web of relationships between content, pedagogy and technology and the contexts in which they function.' (pp.131)

Although several studies have been undertaken to measure teachers' TPACK in different disciplines after its first conceptualization (Willermark, 2018), very few studies were undertaken in exploring Arabic teachers' TPACK (Alharbi, 2019). Therefore, this study fills an existent gap in knowledge by exploring Indonesian Arabic language teachers' TPACK through a validated and reliable instrument adapted from the literature (Bostancıoğlu & Handley, 2018).

In doing so, a primary significance of this study lies in reconceptualizing a more comprehensive vision of TPACK: Maslow's Hierarchy of Need point of view and recognizing the elements of TPACK are not separate; instead, the elements sustain each other at different levels of advancement of teaching. An additional literature search indicates the existing gap in the Indonesian context in

exploring TPACK of the Arabic language teachers. One central research question was formulated, which was subdivided into three sub-questions:

How far is the constitution of TPACK for the Indonesian Arabic teachers?

Guided by this main research question, the study also seeks to determine the extent to which Indonesian Arabic teachers' CK, TK, TCK, TPK, and PCK contribute to their overall TPACK. Thus, the following sub-questions are formulated:

1.a) To what extent do the Indonesian Arabic teachers' CK and TK contribute to their TPACK?

1.b) To what extent do the Indonesian Arabic teachers' TCK, TPK, and PCK contribute to their TPACK?

1.c) What is the Indonesian Arabic teachers' overall TPACK?

2. Literature Review

2.1. The Re-emergence of interest in the Arabic Language in Islamic and Non-Islamic Countries

Islam, being not just a religion but more of a life-long practice of lifestyle, requires its practitioners to use the Arabic language daily - from calling for prayers (*adhan*) and five prayers a day (*Salah*), religious activities including reciting Quran and Hadith, and understanding the meaning of life, all regardless of Arab or non-Arab countries (Ahmad, 2001). Several Muslim countries require Arabic language fluency for Islamic studies as an option in higher education, focusing on the knowledge of basic sources of Islamic studies- Quran, Hadith, through all of which are primarily in Arabic language (Aziz et al., 2016). Along with Islamic studies, the UK government has recognized the need to incorporate the Arabic language for Middle Eastern Studies under modern foreign languages, discounting the notion of radicalization of British Muslims (Bernasek & Canning, 2009). As the world moves towards more technological advancement, the Arabic language keeps up with its pace by incorporating modern technology as a teaching-learning tool (Sulaiman, 2015). Not only that, but the vision of the Arabic language also copes with the 21st-century competencies required for globalization (Sains, 2019; Habibi et al., 2019; Al-khresheh et al., 2020). Thus, it becomes undeniable to overlook the rise of the language, which demands more research in the Arabic language.

2.2. TPACK-The Total Package

In conceptualizing the total package-TPACK, the following figure (Figure 1) visualizes interaction among the elements. It was envisaged primarily by Koehler and Mishra (2005) to understand the interrelationship between teachers' cognitive and thinking aspects with teachers' action and observable effects. Since the model was introduced, it has gained a lot of attention from researchers worldwide and is considered one of the revolutionary visions in education. Many researchers, including the authors themselves, reviewed and explained the model several times (Brantley-Dias & Ertmer, 2013; Koehler et al., 2013; Tweddell, 2015).

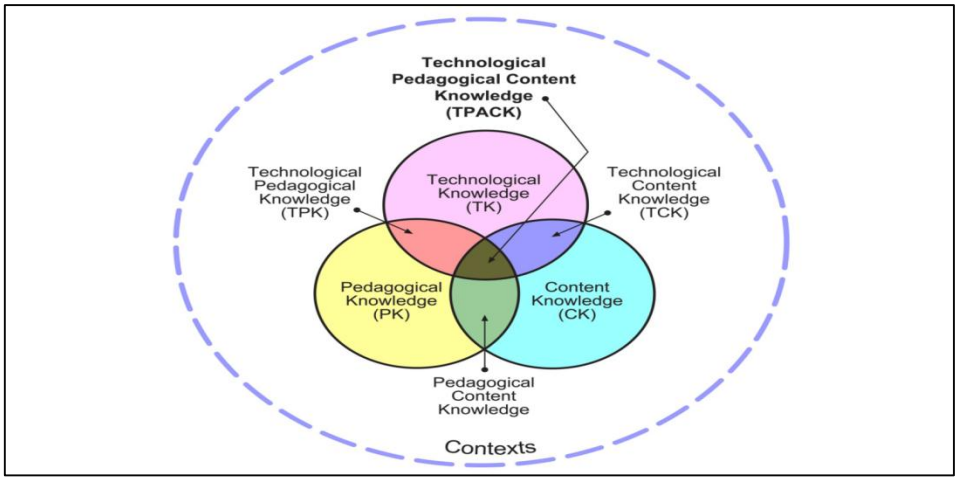

Figure 1. Conceptualization of TPACK (Koehler & Mishra, 2005)

Teaching is inevitably a complex activity, especially in combining teachers' content knowledge with pedagogical skills incorporating technological advancement. Previous attempts to explore teaching qualities focused on the pedagogical aspects and technological aspects as separate entities but the drastic advancements in 21st-century teaching call for integrating the pedagogical strategies' technological aspects (Niess, 2011).

2.3. Educational Learning Theories for TPACK

Primarily based on Shulman's theory of pedagogical content knowledge (Shulman, 1987;1986), the idea of TPACK feeds on different educational theories of learning. Considering the teaching processes worldwide are going through a paradigm shift to move from a behaviorist approach to a more constructivist and humanist approach (Cooper, 1993), the idea of TPACK becomes an umbrella concept that integrates different mechanisms of constructivist and humanist theory. Constructivism advocates for students' learning facilitated by the teacher, thus not only gaining knowledge by lectures or instructions but also taking ownership of the learning through promoting self-efficacy and self-determination (Baviskar et al., 2009; Confrey, 1995; Deci & Ryan, 2010; Gray, 1997; Schunk, 1991). TPACK, containing pedagogical aspects with technological strategies, enables the students to take autonomy of their learning and provides teachers with opportunities to incorporate pedagogical strategies which allow the students to use technological aspects in active learning. Given that the Humanism theory of learning considers other non-cognitive variables of students, such as motivation, curiosity, the creativity of learners (Huitt, 2009), the concept of TPACK promotes the learners' use of technology in the teaching-learning system, which enables them to foster their creativity, learning curiosity and addressing their motivation. Overall, the concept of TPACK integrates almost all aspects of teaching, which has been emphasized as essential for learning achievement over the years.

2.4. Major Elements of TPACK from Arabic Language Point of View

Figure 1 indicates the seven elements of TPACK. These elements are amplified from the Arabic language teaching perspective, sequenced by simple knowledge to complex knowledge.

Content Knowledge, Pedagogical Knowledge, and Technological knowledge in the Arabic Language

In general, Shulman (1986) defined content knowledge as 'concepts, theories, ideas, organizational frameworks, evidence and proof, and established practices and approaches toward developing such knowledge'. However, being specific to the Arabic language, three major components are indicated as

the most critical content knowledge by Zakaria et al. (2019), viz. grammatical knowledge/syntax, Arabic morphology, and *Balaghah* (the art of speaking). Nevertheless, literature often advocates that having competence in content knowledge does not always reflect on the pedagogical aspect (Depaepe & König, 2018). Pedagogical knowledge is defined as a 'specialized body of teachers' knowledge for creating effective teaching and learning environments for all students' (Sonmark et al., 2017, p.11). It is further emphasized that such pedagogical knowledge can be gained by appropriate and adequate training and experience. It should have four dimensions: Structure, motivation and classroom management, adaptivity, and classroom management (Guerreiro, 2017). In terms of the pedagogical knowledge of Arabic language teaching, Alghamdi (2014) introduced six themes: Constructivism, relevance, the dynamic approach according to students' needs, connection, teachers' beliefs, assumptions, and expectations about knowledge, and lastly, technological knowledge, which is considered as more 'flux' than other two streams of knowledge (Koehler et al., 2013), described as a manner 'which enables a person to accomplish a variety of different tasks using information technology and to develop different ways of accomplishing a given task' (Koehler et al., 2013, p. 15). Technological knowledge in the Arabic language, in reality, is going beyond just installing computers; rather it involves developing conducive software and word processing applications that can facilitate language internalization (Ismail et al., 2010).

Pedagogical Content Knowledge, Technological Pedagogical Knowledge, and Technological Content Knowledge in the Arabic language

Pedagogical content knowledge emerged as a procedural way to address the "missing paradigm" and became one of the widest envisioned concepts in the 1980s (Shulman, 2019). It impacted policy on certification and evaluation of teachers and developing and evaluating teacher development programs to increase the quality of education (Deng, 2018). The scope of pedagogical content knowledge was simply explained by Koehler et al. (2013) as,

> 'PCK covers the core business of teaching, learning, curriculum, assessment, and reporting, such as the conditions that promote learning and the links among curriculum, assessment, and pedagogy'. (pp. 15)

In teaching Arabic, PCK comes as a significant attribute (Azizan et al., 2017). It comprises the teachers' content knowledge and pedagogical knowledge towards achieving the target learning outcomes of the Arabic language. Precisely, in the Arabic language, PCK consists of teachers' competence in transforming Arabic content knowledge for teaching, adapting and improvising the Arabic content materials, addressing students' prior knowledge, and appropriate assessment (Jwaifell et al., 2018).

On the other hand, with raising advancement of technology, technological content knowledge becomes essential regardless of the discipline of the teaching area. It primarily refers to the knowledge on ICT (Information and Communication Technology) tools that potentially can be utilized to represent and research the subject matter, except for pedagogical concerns (Koh & Chai, 2016). To address 21st-century learning skills like communication, collaboration, construction, innovation, and regulation, knowledge of technological content becomes indispensable (Herring et al., 2016; Orak & Al-khresheh, 2021). Specifically, in Arabic language teaching, TPK contributes in a wider range, considering the teachers' competence in using ICT in their teaching process, in designing teaching approaches, assessment tools, ensuring not only students' engagement but also promoting students' ICT skills in the course of Arabic lessons (Alayyar et al., 2012).

As emphasized before, technological advancement is emerging in all aspects and integration of technology in pedagogy comes as the need of the times, considering it offers round-the-clock connectivity, advanced teaching materials, digital footprints on education through online classes, and

so on (Ratheeswari, 2018). Technological pedagogical knowledge was simply defined by Valtonen et al. (2019) as,

> 'Knowledge of how to take advantage of appropriate ICT for supporting certain teaching and learning approaches without considering the subject matter.' (pp.493)

Considering all the literature sources, this study offers the following diagram to conceptualize TPACK for the Arabic language. The diagram is inspired by Maslow's (1989) Hierarchy of Needs; in this case, these needs are classified based on the most efficient Arabic language teaching requirements. Thus, the basic need for knowledge is at the bottom as the most important, in the simplest form of knowledge (CK, PK and TK). The complexity of teaching comes consequently, and TPACK or the total package can be considered as the highest achievement level. The study also finds TCK, PCK, and TPC not as separate entities but simultaneously feed one another.

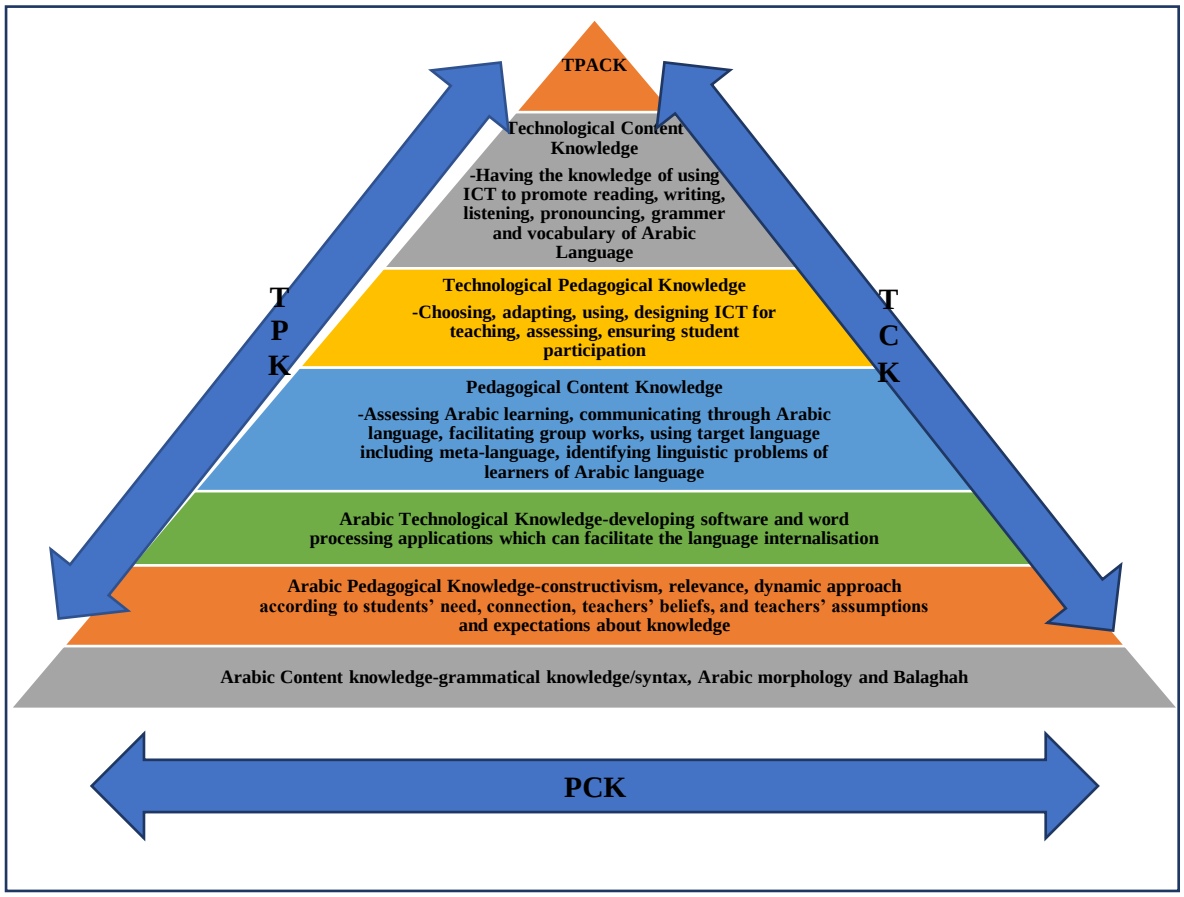

Figure 2. Conceptualizing TPACK, inspired by Maslow's pyramid of need

2.5. Studies Related to TPACK for the Arabic Language

Since the conceptualization of TPACK began, there have been several attempts worldwide in developing instruments to measure teacher quality, and thus, offer development programs for teachers, even evaluate the teacher development programs based on the conceptualization of TPACK (Brantley-Dias & Ertmer, 2013; Koehler et al., 2013; Tweddell, 2015). Yet, preliminary studies exist in exploring Arabic teachers' TPACK (Alharbi, 2019), emphasizing the lack of appropriate instruments to measure Arabic language teachers' TPACK (Bostancıoğlu & Handley, 2018). An exploration of literature regarding TPACK of teachers of Arabic as a second or foreign language showed only one study in the Turkish context on teachers' readiness to incorporate flipped classroom strategy (Jwaifell

et al., 2018). One more study was identified that focused on Saudi Arabian teachers' TPACK for Arabic language teaching. Still, the moot point is that Arabic is not a foreign or second language in Saudi Arabia (Bingimlas, 2018).

In the context of this study, Indonesian teachers' TPACK was measured in different studies for different disciplines but mostly in teaching science-related subjects (Muhaimin et al., 2019; Setiawan & Phillipson, 2020). Two studies have been found in the literature, which measured the TPACK of teachers for English as a foreign language (Drajati et al., 2018). Yet, there has been no attempt to measure the TPACK of Arabic teachers in the context of Indonesia.

Arabic is considered one of Indonesia's most important disciplines, considering its association with Islam (Ritonga et al., 2020). In addition, Arabic in Indonesia impacts industrialization (Albantani & Madkur, 2019), commerce, science, and culture (Tohe & Malang, 2018). Thus, studies have been conducted to improvise the instructional materials to communicate with the Arabic language (Yani & Sara, 2018), even transforming the dictionaries to understand better and learn the language (Taufiqurrochman, 2020). Yet, the research gap remains in exploring the TPACK of Arabic language teachers. This might be due to the lack of instruments to measure Arabic language teachers' TPACK until Bostancıoğlu and Handley (2018) developed a valid and reliable instrument. However, two years after the instrument's development, there is still no research existing in the literature that measures the TPACK of Arabic language teachers in Indonesia. To bridge this gap, this study explores Arabic teachers' TPACK in Indonesia's context.

3. Methodology

3.1. Research Aim and Approach

The study seeks to explore the elements and the interrelation among the elements of TPACK of Arabic language teachers in Indonesia. In doing so, the study follows a quantitative approach. According to Creswell (2012), the quantitative approach applies when the variables are in large numbers and can be expressed numerically and analyzed statistically.

3.2. Participants

To reach the maximum number of eligible participants, the snowball sampling technique is recommended to achieve the target sample (Naderifar et al., 2017), followed in this study for sampling the participants. In the beginning, the instrument was given to 5 university teachers to disseminate to Arabic language teachers. In total, 329 participants responded and showed their willingness to participate in the study. Then using scrutiny based on the last open-ended questions' responses, nine responses were eliminated, considering their irrelevance. So, the final sample size came to 320.

In general, all the participants were Arabic language teachers; approximately one-third of them had received teacher training in content knowledge, pedagogical knowledge, or technological knowledge.

3.3. Instrument

To measure the TPACK of Indonesian teachers for teaching Arabic as a foreign language, this study uses a modified version of the valid and reliable instrument developed by Bostancıoğlu and Handley (2018), which was initially developed to measure teachers' TPACK of teaching English as a foreign language. The validity of the revised instrument was established through expert validation, and further, Cronbach Alpha was measured to establish the instrument's reliability. The final instrument consists of 36 items under six constructs using a 5-point Likert scale for responses. The instrument's

confirmatory factor analysis merged pedagogical knowledge and pedagogical content knowledge as one construct-pedagogical content knowledge.

3.4. Data Collection and Analysis

The primary data was collected by approaching the University teachers who disseminated the questionnaire to the target participants. The data was collected online, using Google Forms. Data analysis was done using the software: (a) SPSS to test the instrument's internal consistency (Cronbach Alpha); (b) JASP for descriptive analysis; (c) Microsoft Excel to compile the statistical data analysis, (d) M+ for modeling; and (e) R for plotting.

3.5. Validity and Reliability of the instrument

The validity was established in the published instrument through expert validation on items, content validation and construct validation. Starting from a total of 76 items, the number of validated items was 55. In addition, exploratory and confirmatory factor analysis was undertaken to establish construct validation, resulting in 36 items under six constructs. Thus, the instrument which is used in this study confirmed its validity.

According to Peters (2018), Cronbach's Alpha value establishes the instrument's internal consistency (reliability) as excellent when the value is more than 0.93. In this study, the overall Cronbach Alpha value was 0.954, which proves the instrument is reliable. The item-specific Cronbach Alpha value is given in Appendix 1, Table 1.

4. Results and Analysis

In this section, the results are presented with an additional analysis of the findings. The descriptive analysis of the overall results is given in Appendix 2, Table 2. The research instrument marginalized the pedagogical knowledge to pedagogical content knowledge. The following section presents the simplest forms of knowledge (CK and TK); the complex forms of knowledge in the second section (PCK, TPK, and TCK). The third section presents the overall TPACK with an additional representation of inter-relationships among the elements of TPACK.

4.1. Teachers' Content Knowledge and Technological knowledge contributing to TPACK

Participant Indonesian Arabic language teachers' content knowledge, as analyzed in Figure 3 shows teachers' general high agreement towards their perception of having content knowledge about the Arabic language. The highest content knowledge on the Arabic language was measured in their competence to monitor their speech (C2). The teachers had the highest percentage of strong agreement when asked about their competence in comprehending Arabic texts correctly (C4). Teachers showed more neutral agreement in evaluating their competence in monitoring their writing accuracy (C1).

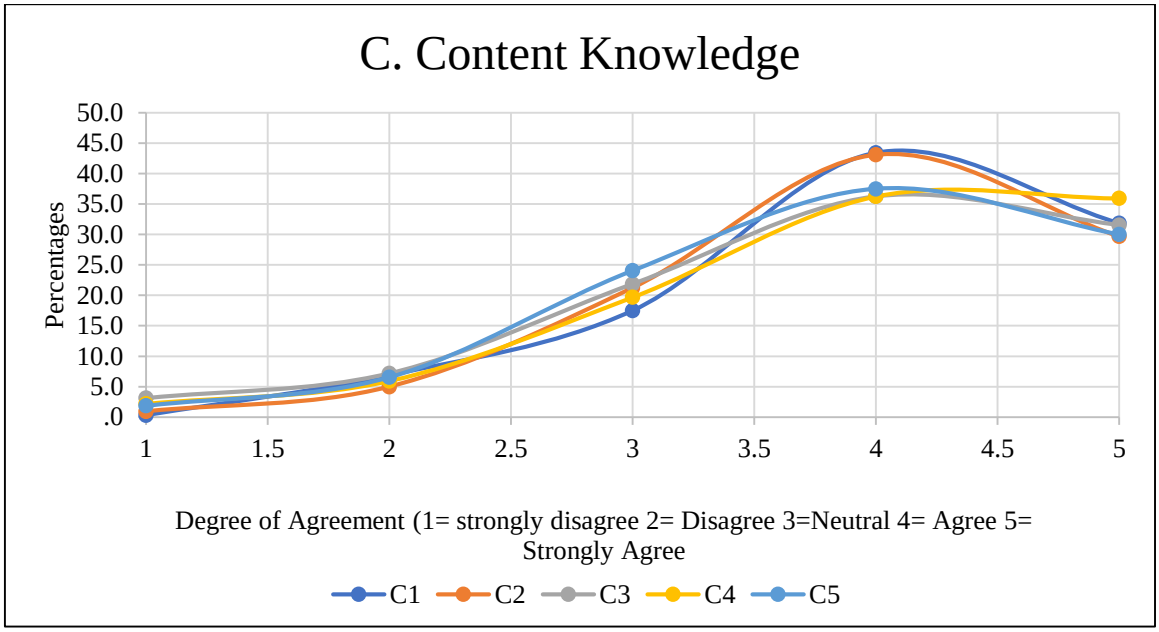

Figure 3. Indonesian Arabic teachers' Content knowledge on the Arabic language

Figure 4 shows the overall agreement on Indonesian Arabic teachers' technological knowledge competence. It can be deducted from the graph that the participant teachers had less competence in the technological aspect when it comes to basic hardware of computers, i.e. CD-ROM, Motherboard, etc. (A6). However, teachers showed the most vigorous agreement in responding towards their competence in playing audio or video files on their computers (A2). Participant Indonesian Arabic language teachers also showed strong agreement on their competence to save files on the computer (A1).

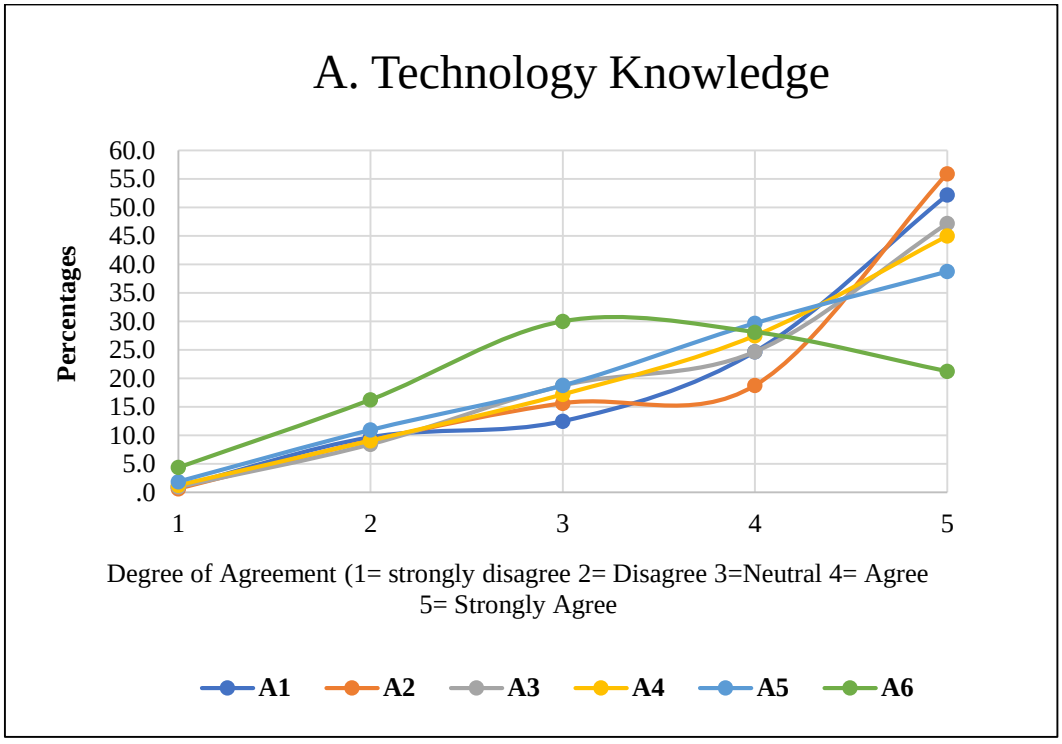

Figure 4. Indonesian Arabic Teachers Technological Knowledge

4.2. Teachers' Pedagogical Content Knowledge, Technological Pedagogical Knowledge and Technological Content Knowledge Contributing to TPACK

Figure 5 depicts the participant Indonesian Arabic language teachers' pedagogical content knowledge. As mentioned in the methodology, the model's confirmatory analysis integrated teachers' pedagogical knowledge and pedagogical content knowledge in the same construct. So, in this construct, teachers' pedagogical knowledge and pedagogical content knowledge are simultaneously analyzed. The figure shows that Indonesian Arabic teachers had the highest agreement in their competence to react supportively to learners' reactions (E7). The participant teachers showed their lowest agreement to their perception of competence in using the target language, including metalanguage (E4). In general, participant Indonesian Arabic teachers showed a neutral response in almost all items (excluding E7) regarding pedagogical content knowledge in teaching Arabic as a foreign language.

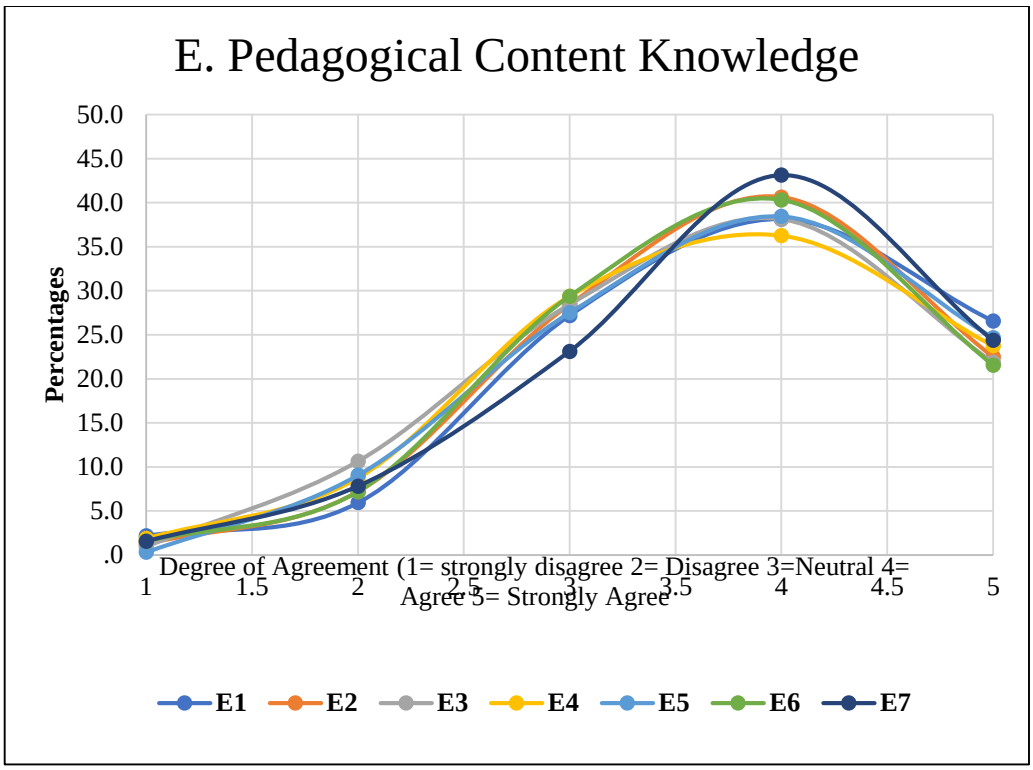

Figure 5. Indonesian Arabic teachers' Pedagogical Content Knowledge

Participant Indonesian Arabic language teachers' technological pedagogical knowledge is depicted in Figure 6. The figure represents teachers' competencies in applying technological approaches in teaching techniques. The figure also shows that participant teachers had the most agreement in their perception of competence in engaging students in solving authentic problems using digital technologies (B6). However, in terms of their competencies on adapting the use of technologies, in different teaching approaches, the participant Indonesian Arabic teachers showed their strongest agreement, (B2) at the same time, teachers had the lowest assumption of their competencies on designing relevant teaching exercises for Arabic language teaching (B4).

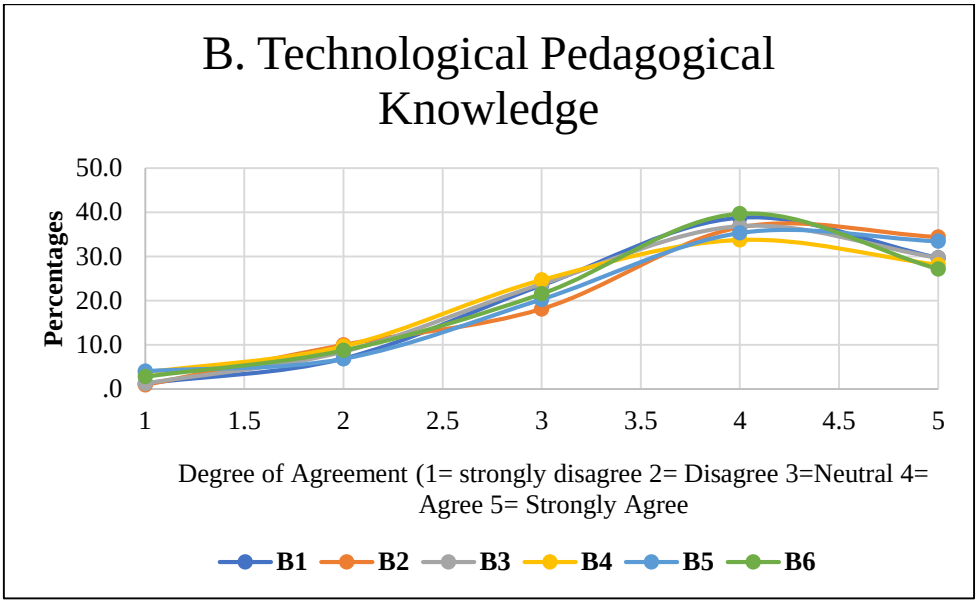

Figure 6. Indonesian Arabic teachers' Technological Pedagogical Knowledge

Participant Indonesian Arabic teachers' technological content knowledge is measured in this construct, amplified in Figure 7. This figure, in general, refers to a moderate competence on participant Indonesian Arabic teachers' technological content, considering a large percentage responded as neutral in each item (excluding D6). Participant teachers showed their highest agreement in knowing technologies to enhance students' Arabic grammar (D1). Their most robust agreement was on understanding the technologies used for listening to Arabic language speech (D6). Teachers showed their most neutral position on knowledge about technologies that can enhance students' vocabulary.

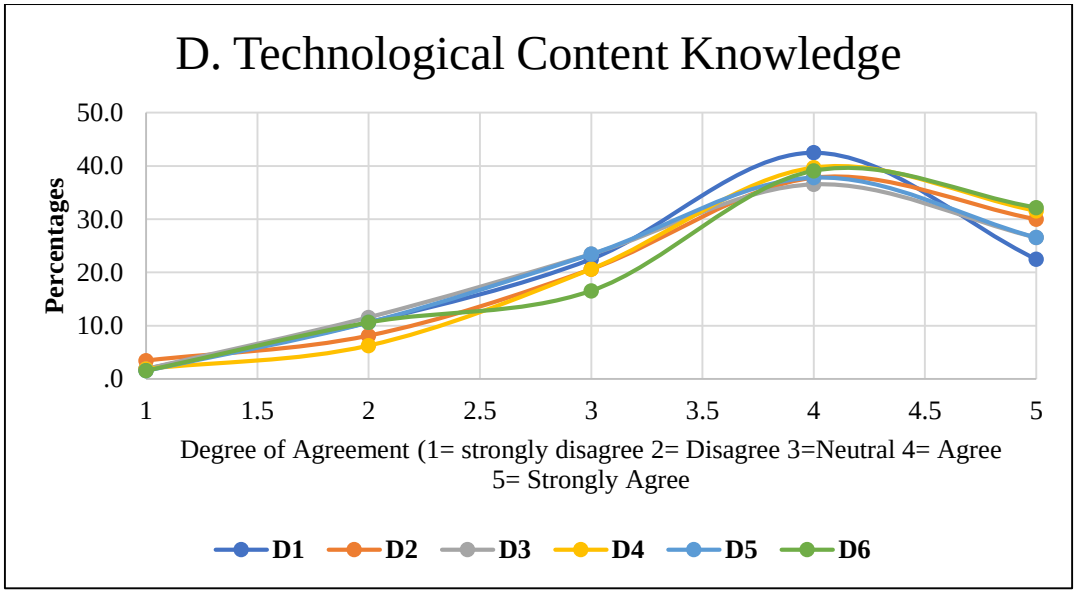

Figure 7. Indonesian Arabic Teachers' Technological Content Knowledge

4.3. Teachers' Overall TPACK

Participant Indonesian Arabic teachers' total TPACK is measured in the 6th construct, represented in Figure 8. The figure, in general, shows a moderate position of the participant Arabic language

teachers of Indonesia, considering approximately one-fourth of the participants' neutral position in all items under this construct. Teachers showed their highest agreement on using technologies effectively to communicate with students and peers (F1). Their lowest perceived competence was visible in their responses on facilitating intellectual understanding by using technologies to engage students with different cultures.

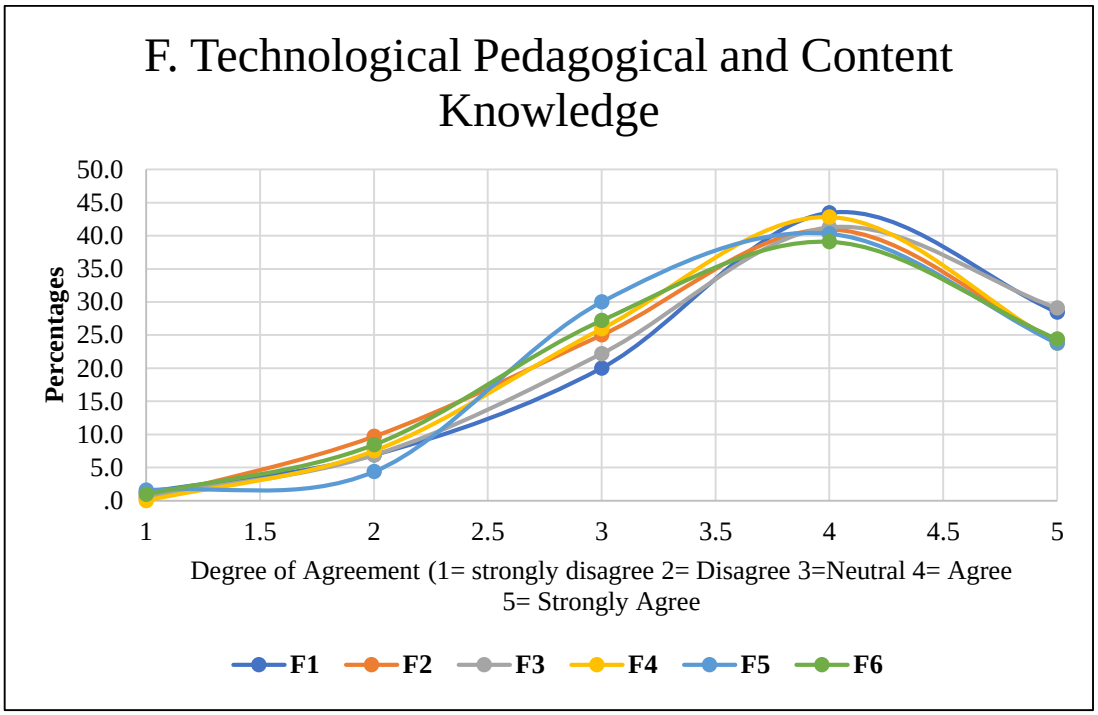

Figure 8. Indonesian Arabic teachers' Technological Pedagogical and Content Knowledge

To analyze the interrelation of the elements of TPACK, considering the elements are not separate, but rather connected with each other, all the constructs were analyzed comparatively, shown by the following figure, Figure 9. The graph represents teachers' strongest agreement in their competence on technological knowledge in teaching the Arabic language, which is one of the essential components of the pyramid of TPACK (Figure 2). Another fundamental element of the TPACK frame is content knowledge on the Arabic language, which from the figure can be seen as not reflecting firm agreement. Rather agreement is moderate in two items only, which are focused on monitoring their speech and writing in the Arabic language. The complex elements, technological content knowledge, pedagogical knowledge, and pedagogical content knowledge have a similar trend of agreements in their responses. However, technological pedagogical knowledge has less agreement than the other two. The top element, technological pedagogical and content knowledge, TPACK, has the same responses as the complex elements.

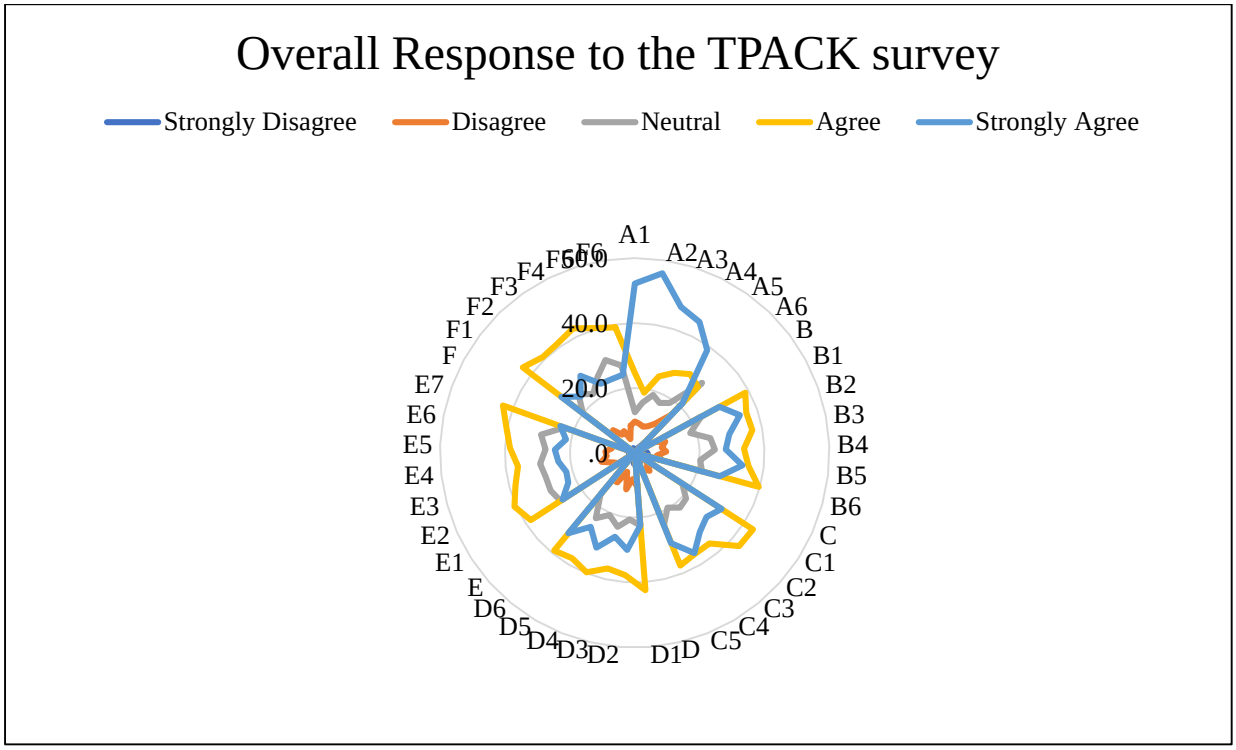

Figure 8. Indonesian Arabic Teachers' Technological Pedagogical and Content Knowledge

5. Discussion

The study sought to measure Indonesian Arabic language teachers' TPACK to explore their content knowledge, technological knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and overall technological pedagogical and content knowledge. The underlying theory in this study emerges from the philosophy that the elements of TPACK are not separate from each other; instead, each element sustains other elements to achieve the final or targeted TPACK of the teachers.

5.1. CK TK, PCK, TCK, TPK Contributing to the Overall TPACK

As amplified in Figure 2, this study conceptualizes content knowledge as the basic need for the other elements of the hierarchy of the overall TPACK. After content knowledge, technological knowledge is a vital primary component of TPACK to sustain the higher elements (PCK, TCK, and TPK). The findings show teachers' competencies for content knowledge of the Arabic language were very good, although it was less than their technological knowledge (Figure 9). This response can be justified by the open ended-question, asking the participant Arabic teachers what type of training or teacher development programs they had attended. Those who had attended some sort of training, either through in-service or pre-service courses or through special workshops, mentioned the efficacy of those training programs on implementing technology in their teaching. However, in Indonesia, Arabic is a foreign language even for teachers (Ritonga et al., 2020). Hence, it is not surprising that the teachers showed moderate competence in Arabic content knowledge.

Considering the argument from the literature that content knowledge cannot always be parallel to teachers' pedagogical content knowledge (Depaepe & König, 2018), this study also arrives at similar findings. The participant teachers' agreement on their content knowledge of familiarity with Arabic language culture was higher than their pedagogical content knowledge to choose the target language to make the students familiar with the Arabic language culture (Figures 3, 5; items C5, E4). This

difference in the teachers' content knowledge not reflecting in their teaching lies in the concept that teaching a foreign language needs more pedagogical techniques than only having content knowledge, which can be gained through adequate training and experience (Guerreiro, 2017). This can also result from the lack of research on Indonesian Arabic teachers' pedagogical content knowledge, leading to initiatives to improve teachers' pedagogical content knowledge. Nevertheless, the teachers' higher competence in Arabic content knowledge monitoring their speech or comprehension of Arabic texts is reflected in their pedagogical content knowledge measurement. They showed their strongest competence in responding to students' speech or texts (Figures 5 and 6; Items C2, C4, E7). The confidence level of the teachers can explain this result for having Arabic solid content knowledge and, thus, the competence to respond to students' reactions.

In terms of technological content knowledge, teachers' strong competence in playing audio and video files reflects their technological content knowledge with more vital competence in using audio or video files to help students learn new words (Figures 4 and 7; items C2, C4, A2). This again reflects the teachers' engagement in training related to Information Technology and, thus, strong competence in using technology for students' internalization of grammar and vocabulary (Al-khresheh & Orak, 2021; Ismail et al., 2010). However, in general, participant Indonesian Arabic teachers' technological knowledge was higher than technological pedagogical knowledge, especially in terms of designing tasks for students using technology (Figures 4 and 6, items A6, B4). This result can be explained by teachers' lack of technological knowledge on intensive technical aspects of information technology, reflecting on their lack of competence to use ICT to design and utilize students' digital tasks. Several studies have emphasized the importance of technology to learn vocabulary (Yani & Sara, 2018), and even transforming dictionaries in Indonesia (Taufiqurrochman, 2020). But lack of emphasis is given to improving teachers' competence in design-based learning using ICT.

5.2. TPACK inclusive of all elements

In comparing the overall TPACK of participant Indonesian Arabic teachers regarding their content knowledge and technological knowledge, and the complex components, TCK, TPK, and PCK, surprisingly, the technological aspect was more evident than content knowledge (Figure 9). Teachers have mentioned their stronger competence in using technology to communicate with or pursue teaching-learning activities with students in their TPACK (Figure 8). However, the intellectual aspect was the least strong in the overall TPACK of the Indonesian participant teachers (Figure 8, item F6), which reflects teachers' lack of pedagogical content knowledge on introducing Arabic language cultures, although having their strong Arabic content knowledge about that which has been discussed earlier (Figures 3 and 5; items C5, E4). This response crystallizes the need for teachers' training, not only oriented to using ICT to promote Arabic grammar and vocabulary but also shed light on the importance of the Arabic language to lead an Islamic lifestyle, respecting the Quran, Hadith, and other sources (Aziz et al., 2016).

5.3. Pedagogical implications

The study's pedagogical implication can be stipulated from the conceptualization of TPACK as a combination of 6 inter-related elements that sustain each other. Thus, it indicates that the Indonesian Arabic teachers should move beyond the simplest forms of knowledge (Arabic content knowledge, technological knowledge, and pedagogical knowledge) and move towards the complex forms of knowledge, where two or more simple forms of knowledge are merged to achieve the expected learning outcomes. This means that the Indonesian Arabic teachers having the Arabic CK, PK and TK

should combine their CK with PK (performing PCK), technological aspects with Arabic CK and PK, etc.

6. Limitations and Recommendations

The study does not explore the impact of teachers' experience on their TPACK of Arabic language teaching. The study participants were purposefully chosen; as a result, the data need not reflect the global scenario of Indonesian Arabic teaching-learning practices.

The study recommends exploring the teachers' experiences and training on the TPACK of Indonesian Arabic teachers for educators and researchers. For the concerned authorities, the study suggests imparting adequate and proper training to the Arabic teachers to promote technology use in designing and assessing the Arabic language courses.

7. Conclusion

The study aimed to explore Arabic teachers' technological pedagogical and content knowledge for the first time in Indonesia. In general, it can be derived from the survey that the participant teachers had the most decisive competence in their technological aspects, which can be used for communicating with students or improving the students' grammar and vocabulary. The content knowledge of the participant teachers was the strongest in the monitoring of their speech and text. The participants' pedagogical content knowledge, technological content knowledge, and technological pedagogical knowledge reflected the need to promote pedagogical techniques beyond only grammar and vocabulary, more towards designing tasks using ICT and emphasizing the need to build the procedural link of Arabic language and Islamic studies, and language culture. The overall TPACK results showed the need to stress the students' intellectual growth through adequate and appropriate training of the Arabic teachers in Indonesia.

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Appendix 1

Table 1. Item specific Cronbach Alpha value

Item-Total Statistics				
Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
A1. I know how to save data into/from a digital device (i.e. flash disk, USB stick, CD)	134.68	472.351	.343	.955
A2. I know how to play audio and video files on my computer	134.65	472.542	.338	.955
A3. I know how to use computer mediated communication (CMC) technologies (e.g. email, chat)	134.77	470.330	.391	.955
A4. I know how to record video files (i.e. using a video camera)	134.79	465.769	.490	.954
A5. I know how to use generic office applications (i.e. Word, PowerPoint, and Excel)	134.93	464.769	.492	.954
A6. I know about basic computer hardware (i.e. CD-ROM, mother-board, RAM) and their functions	135.40	458.391	.609	.953
B1. I can choose technologies that enhance students' learning for a lesson	134.97	459.745	.693	.953
B2. I can adapt the use of the technologies that I am learning about to different teaching activities	134.92	459.548	.661	.953
B3. I can choose technologies that enhance the teaching approaches for a lesson	135.00	457.398	.729	.952
B4. I can design relevant learning experiences to promote student learning, using technology	135.12	455.408	.698	.952
B5. I can choose technologies to be used in assessment	134.98	456.407	.681	.953
B6. I can engage students in solving authentic problems using digital technologies and resources	135.06	458.843	.662	.953

C1. I can monitor my own writing for accuracy	134.86	465.785	.581	.953
C2. I can monitor my own speech for accuracy	134.90	469.303	.490	.954
C3. I can comprehend Arabic speech accurately	134.99	470.125	.394	.955
C4, I can comprehend Arabic texts accurately	134.87	471.439	.383	.955
C5. I am familiar with the culture(s) of target language communities	134.98	468.307	.466	.954
D1. I know about technologies that I can use to teach Arabic language grammar	135.12	463.324	.581	.953
D2. I know about technologies that I can use to teach reading in Arabic	135.02	460.714	.600	.953
D3. I know about technologies that I can use to teach writing in Arabic	135.11	460.380	.621	.953
D4. I know about technologies that I can use to teach Arabic vocabulary	134.92	462.352	.617	.953
D5. I know about technologies that I can use to teach pronunciation of Arabic words	135.08	461.855	.603	.953
D6. I know about technologies that I can use to teach listening in Arabic	134.96	459.591	.647	.953
E1. I can assess student learning in multiple ways	135.04	458.688	.708	.952
E2. I can choose an appropriate approach to teach learners (i.e. communicative approach, direct method)	135.09	461.628	.668	.953
E3. I can facilitate learning through creating opportunities for individual, partner, group and whole class work	135.16	459.301	.699	.952
E4. I can plan when and how to use the target language, including meta-language I may need in the classroom	135.14	461.381	.630	.953
E5. I can keep students on task	135.07	463.283	.620	.953
E6, I can identify linguistic problems experienced by learners (i.e. phonological, lexical or grammatical problems)	135.12	462.070	.651	.953
E7. I can react supportively to learners' interaction	135.04	461.722	.649	.953
F1. I can use technology effectively to communicate relevant information to students and peers	134.94	460.824	.683	.953
F2. I can use a range of technologies that enable students to become active participants	135.07	459.886	.709	.952
F3. I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn	134.94	460.739	.698	.953
F4. I can use a range of technologies to help students pursue their individual curiosities	135.02	462.908	.671	.953
F5. I can provide equitable access to digital language learning tools and resources	135.05	461.427	.689	.953
F6. I can facilitate intercultural understanding by using technology to engage students with different cultures	135.08	462.825	.623	.953

Appendix 2

Table 2. Descriptive statistics of the results

Items	N	Range	Minimum	Maximum	Mean	Std. Deviation
A1. I know how to save data into/from a digital device (i.e. flash disk, USB stick, CD)	320	4	1	5	4.18	1.045
A2. I know how to play audio and video files on my computer	320	4	1	5	4.20	1.047
A3. I know how to use computer mediated communication (CMC) technologies (e.g. email, chat)	320	4	1	5	4.09	1.038
A4. I know how to record video files (i.e. using a video camera)	320	4	1	5	4.06	1.047
A5. I know how to use generic office applications (i.e. Word, PowerPoint, and Excel)	320	4	1	5	3.92	1.086
A6. I know about basic computer hardware (i.e. CD-ROM, mother-board, RAM) and their functions	320	4	1	5	3.46	1.125
B1. I can choose technologies that enhance students' learning for a lesson	320	4	1	5	3.89	.953
B2. I can adapt the use of the technologies that I am learning about to different teaching activities	320	4	1	5	3.93	1.004
B3. I can choose technologies that enhance the teaching approaches for a lesson	320	4	1	5	3.85	.983
B4. I can design relevant learning experiences to promote student learning, using technology	320	4	1	5	3.73	1.088
B5. I can choose technologies to be used in assessment	320	4	1	5	3.87	1.080
B6. I can engage students in solving authentic problems using digital technologies and resources	320	4	1	5	3.80	1.026
C1. I can monitor my own writing for accuracy	320	4	1	5	4.00	.894
C2. I can monitor my own speech for accuracy	320	4	1	5	3.96	.891
C3. I can comprehend Arabic speech accurately	320	4	1	5	3.86	1.042
C4, I can comprehend Arabic texts accurately	320	4	1	5	3.98	.997
C5. I am familiar with the culture(s) of target language communities	320	4	1	5	3.87	.979
D1. I know about technologies that I can use to teach Arabic language grammar	320	4	1	5	3.73	.987
D2. I know about technologies that I can use to teach reading in Arabic	320	4	1	5	3.83	1.056
D3. I know about technologies that I can use to teach writing in Arabic	320	4	1	5	3.74	1.034
D4. I know about technologies that I can use to teach Arabic vocabulary	320	4	1	5	3.93	.969

D5. I know about technologies that I can use to teach pronunciation of Arabic words	320	4	1	5	3.77	1.008
D6. I know about technologies that I can use to teach listening in Arabic	320	4	1	5	3.90	1.023
E1. I can assess student learning in multiple ways	320	4	1	5	3.81	.969
E2. I can choose an appropriate approach to teach learners (i.e.communicative approach, direct method)	320	4	1	5	3.76	.924
E3. I can facilitate learning through creating opportunities for individual, partner, group and whole class work	320	4	1	5	3.69	.960
E4. I can plan when and how to use the target language, including meta-language I may need in the classroom	320	4	1	5	3.71	.985
E5. I can keep students on task	320	4	1	5	3.78	.931
E6, I can identify linguistic problems experienced by learners (i.e.phonological, lexical or grammatical problems)	320	4	1	5	3.73	.932
E7. I can react supportively to learners' interaction	320	4	1	5	3.81	.946
F1. I can use technology effectively to communicate relevant information to students and peers	320	4	1	5	3.91	.931
F2. I can use a range of technologies that enable students to become active participants	320	4	1	5	3.79	.929
F3. I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn	320	4	1	5	3.91	.916
F4. I can use a range of technologies to help students pursue their individual curiosities	320	3	2	5	3.83	.877
F5. I can provide equitable access to digital language learning tools and resources	320	4	1	5	3.80	.904
F6. I can facilitate intercultural understanding by using technology to engage students with different cultures	320	4	1	5	3.78	.943
Valid N (listwise)	320					