



Understanding Language Teachers' ICT Uptake from Ecological Perspectives

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| Abstract | Article Info |
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| <p>This paper summaries factors affecting teachers' decision to use ICT (Information and Communication Technology) in teaching modern languages. This paper tries to understand the teachers' ICT uptake from ecological perspective discussing that teachers' attitudes are influenced by environments in different levels (e.g. micro, meso, macro). In this paper, the environments refer to micro as teacher, meso as institution, and macro as beyond institution levels. Teacher levels define the aspects related to teachers' psychological and demographic characteristics. Institutions levels describe the teachers' decision from the influence of support and social circle in the institution. Beyond institution levels discuss the influence from wider environments such as government and public demand.</p> | <p>Article History Received : 19-01-2024, Revised : 28-01-2024, Accepted : 31-01-2024</p> <p>Keywords: Language teaching; ICT uptake; Ecological perspective.</p> |

A. Introduction

Understanding teachers' attitudes in ICT uptake has been a popular discussion, and much literature has tried to look at it from different perspectives and theories. Ecological framework is one of the interesting theories to understand the uptake as it could present holistic explanation from different environmental perspectives (Hammond, 2020). Moreover, understanding the teachers' use of ICT in language teaching is considered important as it can give more contribution in teaching and learning process. ICT could provide easier and more practical ways to do material preparation, access to authentic materials, encourage students' collaboration, and give feedback (Alivi, 2022). Some studies using ecological perspectives to explain teachers' ICT adoption in teaching include Zhao and Frank (2003) and Davis, et al (2019). The ecological frameworks presented by them used ecosystem biological terms such as ecosystem and living species to define environments and subjects or technology users. Despite having different concept and explanation of ecological perspectives, these theories are useful to understand the important of environments in influencing teachers' decision in technology use in school contexts.

Another studies, Buabeng-Andoh (2012) and Pandolfini (2016), reviewed encouraging and discouraging factors influencing teachers' ICT uptake

from three different levels with different terms. Buabeng-Andoh explains using personal characteristics, institutional characteristics, and technological characteristics as key terms. Meanwhile, Pandolfini used terms micro-level, meso-level, and macro-level. Adapting from Buabeng-Andoh and Pandolfini, this paper uses terms of teacher-level, institution level, and beyond-institution level to explain the teachers' technology adoption.

B. Research Method

This study carried out descriptive research using literature review as an approach to summarise factors affecting language teachers in technology adoption from different literature and research settings. In the process of filtering the literature, this paper focuses on modern language teaching such as teaching Arabic and English as key words of research contexts. This paper also summarised previous research from different settings from Western, African, and Asian contexts (Connaway & Radford, 2021).

C. Research Results and Discussion

1. Teacher Levels

Teacher levels consist of teachers' beliefs in ICT usefulness, beliefs in pedagogical practice, self-efficacy in ICT use, ICT competence, personal teaching experience, and language skills the teacher taught. Some studies (e.g. Buabeng-Andoh, 2012; Gamlo, 2014) include demographic aspects such as age and gender as ICT uptake predictors, it is not discussed in this paper as they are not considered significant contributions to the ICT adoption.

Teachers' beliefs

Teachers' beliefs are considered an important factor in encouraging and discouraging teachers' technology adoption. According to Ajzen and Fishbein (1980) on their 'Theory of Reasoned Action in Human Psychology', individuals' behaviours are triggered by individuals' beliefs, implying that teachers with positive attitudes toward ICT have tendency to use technology in teaching practices as they have higher awareness in the technology usefulness in teaching (Kihiza et al., 2016; Msila, 2015; Tezci, 2009). On the other hand, teachers' having negative beliefs in ICT usefulness are inclined to have negative attitudes in ICT use (Msila, 2015). Msila reported that 75% of the research participants believed that traditional media (white-board) was better than technological-based media, as technology use could students' learning attention. Furthermore, according to Alivi (2022), teachers were inclined to use technology in teaching when it was easy to use and made their work easier, such as supporting preparation and compensating for limits on

teaching time (i.e. extending teaching activities remotely by giving assignments beyond the class).

Besides beliefs in ICT usefulness, teachers' beliefs in pedagogical approaches are also an important determiner. According to some studies (Hasan, 2016; Hermans, et al, 2008; Teo, et al, 2018; Gamlo, 2014), teachers having constructive or interactive pedagogical beliefs showed higher positive attitudes toward ICT use than those having instructional teaching beliefs. One of the factors affecting teachers' resistance to use technology in teaching is explained by Ertmer (2015) that they were affected by previous teaching experiences which have been deeply constructed in their habit and practice. In addition, Alivi (2022) added that teachers were inclined to use and were encouraged to learn new technology when they felt they it contributed to their teaching success, for instance, could invite students' active participation and engagement.

Teachers' ICT self-efficacy

The influence of teachers' self-efficacy in ICT use explains that teaching having higher confidence in technical technology skills are likely to have higher technology adoption in teaching (Gamlo, 2014; John, 2015). This is affected by less anxiety they have in technological operation (e.g. for masking mistakes and breaking the devices) and the confidence to fix the technical problems during teaching (Kumar and Daniel, 2016). In addition, Kumar and Daniel reported that teachers frequent use in the technology could improve their confidence in its use as they became familiar with it.

Teachers' ICT competence

While ICT self-efficacy is related to confidence in the operation, ICT competence refers to technical skills. There is a relationship between ICT competence and ICT self-efficacy (Jones, 2004; Msila, 2015, Peralta and Costa, 2007). It is explained that teachers having high self-efficacy tend to have high ICT competence. For example, Jones reported that teachers were reluctant to use ICT in teaching due to their avoidance to show technological incompetency to their students. Teachers felt anxious to be considered unprofessional by students and colleagues for showing lack of ICT skills due to frequently asking for help in solving technical problems (Msila, 2015).

Teachers' teaching experience

Teachers' length of teaching experience is also a predictor to teachers' ICT adoption. Some studies reported that the most frequent ICT use in teaching was shown by experienced teachers (e.g. Lau & Sim, 2008; Gamlo, 2014).

Some other studies also stated that new teachers are inclined to have greater intention to integrate technology in teaching as they are considered

are more familiar with new technology use (e.g. Buabeng-Andon, 2012; Msila, 2015). Furthermore, Alivi (2022) reported that teachers' length of teaching experience and age did not show important contributions in the ICT uptake as all the participants (in different age groups) used technology in teaching. However, her study highlighted that none of the participants' age was above 45.

Nonetheless, teachers' academic background and experiences in pedagogical practice contributes to creativity of teachers' ICT adoption (Alivi, 2022). Teachers with formal pedagogical knowledge (i.e. English language teaching graduates) showed to be more creative in the use of technology than those were not (i.e. linguistics and literature graduates).

Teaching discrete language skills

Alivi (2022) that language skills the teachers taught affected to the frequency and the creativity of teachers' technology use in teaching. It was reported that teachers were reliant in the use of technology in teaching listening and used the least in teaching writing. In addition, teachers' use of technology to teach speaking skills was mostly used to support activities beyond classroom, for example, giving students video creation projects..

2. Institutional Level

Dalam Factors affecting teachers' ICT adoption in the institutional level include access and support, training, social circle environment, workload, and cultural leadership.

Access and support

Institutions which facilitate teachers with adequate and good access to infrastructure and support are inclined to encourage teachers ICT adoption in teaching (Gamlo 2014; John, 2015; Alivi, 2022). Kihoza et al.'s (2016) reported that most of the teacher trainers showed low ICT integration due to lack of ICT skills (i.e. performing and being familiar with limited numbers of computer application) and inadequate ICT supports such as lack of access to computers, low internet connection, and weak power supply. Furthermore, Kumar and Daniel (2016) found that institutions with well-established resources and good support in professional development positively affected teachers' intention to adopt technology in teaching.

Training

Another important factor predicting the teachers' ICT use is training or continuing professional development (CPD). Reid (2014) suggests that technical training in technology use gave positive contribution to teachers to develop their technology competence and make them more comfortable to use it in teaching practice.

CPD is commonly related to the provision of training such as pre-service and in-service training to teachers. According to Lieberman (1995), there are three types of CPD comprising direct teaching (i.e. a formal form like workshop and conference), learning in school (i.e. from peers, or in an informal form) and learning out of school; (i.e. collaboration, partnership – informal).

In the institutional levels, training here is included in the direct teaching type. Many studies reported that teachers were reluctant to use new technology as they lacked technical competence and institutions provided irrelevant training programs, i.e. not focusing on technology promotion (Schoepp, 2005; Alivi, 2022). Furthermore, Ghamdi (2015) indicated that teachers were reluctant to attend ICT training as it was not made compulsory. Some studies suggested that ICT-related training should be regular and relevant to teachers' need (Ghamdi, 2015; Alivi, 2022; Gamlo, 2014).

Social circle environment

Schools or higher education institutions are academic communities in which cultures, traditions, norms and interplay among societal members may affect the institutions' condition. Accordingly, teachers' beliefs and attitudes in teaching, particularly in ICT uptake, could be also influenced by the community condition and support. As Reid (2014) claims that the decision of ICT adoption may be driven by a cultural change guiding an institution to integrate technology adapting to the changing environment. The environment here means the influence of leaders, colleagues as well as support from administrative and IT staff (Reid, 2014; Kumar and Daniel, 2016; Alivi, 2022; Buabeng-Andoh, 2012; Msila, 2015). According to Alivi (2022) colleagues contributed to the teachers' technology adoption from sharing successful experiences in the technology use in teaching. This was explained that teachers had tendency to try and adapt the successful practice into their teaching after listening to their colleagues' story, particularly to those they considered close.

Workload

The other concern considered to be a factor affecting teachers' decision on technology uptake is workload by institutions. Teachers in higher education are normally pressured to deal with some tasks beyond teaching such as assessment, curriculum development, timetabling, research, and discipline (Selwyn, 2017; McKay et al., 2016). Teachers having leadership positions were also reported to have difficulties to manage their time to learn new technology (Samarawickrema and Stacey, 2007). Nonetheless, Alivi (2022) reported that teachers felt that the workload beyond teaching task were

still manageable, and technology still helped them to support dealing the workload, for instance, from repurposing materials.

Cultural leadership

Cultural leaderships mean the role of leaders to set and promote policy in technology use in teaching. This aspect is considered contributing to teachers' technology adoption (Albugami & Ahmed, 2015; Buabeng-Andoh, 2012; Ertmer & Ottenbreit-Leftwich, 2010; Alivi, 2022). For example, Alivi (2022) reported that implicit ICT policy by the leaders gave their flexibility on teaching application, and the technology use was not made compulsory. This policy led to some teachers' reluctance to learn new technology. Another discouragement was also shown in Albugami and Ahmed (2015) study in Saudi Arabia, teachers were discouraged to use the internet in teaching due to the headmasters' restriction to avoid negative influence from the internet e.g. pornography.

3. Beyond Institutional Level

In the beyond institutional level, factors predicting language teachers' ICT uptake cover government budget and curriculum, commercial industry pressure, public demand, and students' demand.

Government budget and curriculum

Restricted budget (e.g. for providing well-establish ICT facility, infrastructure, resources, and CPD) from governments is believed to be one of the constraints of teachers' ICT use (for example, Wastiau et al., 2013). In addition, Schoepp (2005) found that the absence of establishing ICT policy in curriculum affected teachers' reluctance in ICT uptake. Schoepp suggests that inserting the requirement of technology integration and sustainability in teaching into the curriculum is needed to achieve use.

Another discouraging factor is lack of funding provided by the government for teachers to have ICT-related professional development. Alivi (2022) reported that teachers felt dissatisfied and disappointed as teachers' professional development were not made inclusive, only permanent and civil-servant teachers had higher opportunities for these benefits or funding.

Moreover, the clarity of government policy promotion also influences teachers' decision to adopt and learn new technology in teaching (Alivi, 2022). It is reported in her study that some teachers were aware of the existence of ICT policy promotion, but they felt it was not explicit. This implicit policy discouraged them to improve their ICT competence to be applied in teaching.

Commercial industry pressure

The popularity of technology use in public has attracted institutions to make it as a valuable market strategy. Thus, many institutions have used it as

a product to promote their institutions (i.e. as a modern institutions). Reid (2014) stated that new the direction of new business models in the academic contexts comprise the promotion of technology use in academic and administrative affairs, or many call it as digital-based education.

Public demand

As overall public has made technology as part of life, it is not only institution policy affected but also teachers. In addition, as part of the social community, teachers also build technology dependency in their lifestyle, which also influence to their way of teaching in the use of media or technology to support teaching (Alivi, 2022; Pandolfini, 2016; Facer, 2012, Wachidah, 2023).

Furthermore, Alivi (2022) reported that the popularity of WhatsApp in teachers' daily use had led to their teaching adjustment using ICT. They said that they preferred to use WhatsApp to support teaching not only for communication but also sharing resources and students' collaboration due to its ease of use.

Students' demand

The popularity of technology use by students may lead institutions to adapt the policy with their needs. The students' dependency in technology may put pressure on institutions to provide adequate technology resources (Reid, 2014). Reid also points out that the changing role of ICT use directs students to demand the institution to develop technology-based learning such as mandatory course websites or online instructional materials. Similarly, Alivi (2022) indicated that a few teachers were encouraged to learn new technology (e.g. the use of Kahoot) in teaching due to students' request. This forced the teachers to learn how to use it and apply it in teaching. This implies that if there is a high demand for technology integration from students, it will encourage or force teachers to use ICT in teaching practices.

Teachers' self-learning

Teachers self-learning in new technology refers to activities to learn new technology applied in teaching from professional developments beyond the institutions (Alivi, 2022). This includes attending conference organised by other institutions, learning from online courses such as from Coursera, or searching resources from social media, journal, and YouTube. In Having external professional development became teachers' preference as it could provide flexibility in learning time (Smith et al., 2009) and they had limited formal CPD support from the institutions (Alivi, 2022).

To summarise, Table 1 presents important points of the review on factors encouraging and discouraging language teachers in technology adoption in teaching.

Tabel 1. *Factors influencing teachers' ICT uptake*

| | Encouraging | Discouraging |
|----------------------------|--|---|
| Teacher level | <ul style="list-style-type: none"> • Having positive beliefs in ICT usefulness • Holding pedagogical beliefs in constructive or interactive approaches • Having positive beliefs in ICT contribution teaching | <ul style="list-style-type: none"> • Having negative beliefs in ICT usefulness • Holding traditional teaching beliefs • Having negative beliefs in ICT contribution teaching |
| | <ul style="list-style-type: none"> • Having high confidence in ICT technical use • Using technology frequently | <ul style="list-style-type: none"> • Having low confidence in ICT technical use • Being afraid doing mistakes and damaging devices |
| | <ul style="list-style-type: none"> • Having competence in technical technology operation | <ul style="list-style-type: none"> • lacking competence in technology operation • Having anxiety for being recognised as unprofessional |
| | <ul style="list-style-type: none"> • Having formal pedagogical knowledge | <ul style="list-style-type: none"> • Having non-formal pedagogical knowledge |
| | <ul style="list-style-type: none"> • Teaching listening skills • Teaching speaking beyond classroom | <ul style="list-style-type: none"> • Teaching writing |
| Institutional level | <ul style="list-style-type: none"> • Having adequate resources to support teaching | <ul style="list-style-type: none"> • Having lack of instructional resources |
| | <ul style="list-style-type: none"> • Having regular support for technology-based training • Having compulsory and regular training | <ul style="list-style-type: none"> • Having training not focusing on technology integration in teaching • Having irregular and flexible training time |
| | <ul style="list-style-type: none"> • Having adequate IT and administrative support staff • Learning from colleagues | <ul style="list-style-type: none"> • Having no or lack support from IT and administrative support staff |
| | <ul style="list-style-type: none"> • Having manageable workload | <ul style="list-style-type: none"> • Having heavy workload for tasks beyond teaching (research and administration) |
| | <ul style="list-style-type: none"> • Having leader's ICT policy compulsory or explicit | <ul style="list-style-type: none"> • Having implicit ICT policy from the leader • Leaders having low belief in ICT usefulness in teaching |

| | | |
|-----------------------------------|--|--|
| Beyond Institutional Level | <ul style="list-style-type: none"> • Receiving adequate budget for technological resources from government | <ul style="list-style-type: none"> • Receiving restricted budget for technological resources from government • Having not inclusive professional development • Considering ICT use policy is not explicit |
| | <ul style="list-style-type: none"> • Having public pressure as technology being part of their lifestyle • Enhancing institutions accreditation • Having students' demand on the application of digital based instruction in administration • Having students request to use certain technology in teaching | <ul style="list-style-type: none"> • Having low familiarity of technology use in society |
| | <ul style="list-style-type: none"> • Joining external professional development | <ul style="list-style-type: none"> • Having lack interest in having external professional development |

D. Conclusion

Understanding language teachers' ICT uptake using ecological perspectives could give a comprehensive explanation. Teachers' decision cannot be seen only one perspective, for example, teachers' internal characteristics, but also their environments from different levels. Therefore, this review is expected to give readers, especially policy makers, wider perspective to understand teachers' technology adoption, and consider it as a contributing aspect to make appropriate ICT-related policy adjusting teachers' and students' need.

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