A Study of Smart Technology Utilization and Mandarin Language Instruction

Nurul Ain Chua, Azza Jauhar Ahmad Tajuddin, Che Mohd Zaid, Azlina Musa, Ismar Liza Mahani Ismail and Najihah Binti Abdul Mutalib
Center for Foundation and Continuing Education
Universiti Malaysia Terengganu
21030 Kuala Nerus, Terengganu, Malaysia
ain.chua@umt.edu.my, azzajauhar@umt.edu.my, cmzaid@umt.edu.my,
azlinamusa@umt.edu.my, ismarhani@umt.edu.my, najihah.mutalib@umt.edu.my,

Goh Ying Soon
UniversitiTeknologi MARA
54000 Kuala Lumpur,
Wilayah Persekutuan Kuala Lumpur, Malaysia
gohyi41@tganu.uitm.edu.my

Jumadil Saputra
Faculty of Business, Economics and Social Development
Universiti Malaysia Terengganu
21030 Kuala Nerus, Terengganu, Malaysia
jumadil.saputra@umt.edu.my

Abstract

Today, the twenty-first-century curriculum has been transformed into innovation activities that incorporate the latest technologies and concentrate on student-centred approaches. However, to what extent has innovation based on IR 4.0 technology achieved its objectives. Innovation in language education can only happen through attempts to diversify pedagogy, consider students and educators, and understand the consequences of teaching new communication in multiple contexts. Therefore, the study explores successful means of learning through innovative technologies, the degree to which the transition from teacher-centred learning to student-centred has taken place. This research evaluated based on a five-step methodology. The findings show that Mandarin's teaching and learning have made a range of developments tailored to the use of innovative technology applications in line with global demand. Educator-centred education is gradually shifting to student-centred instruction. However, the question is how the mastery of a pedagogical viewpoint can be expanded. This concern is due to smart technology integration preparation, which recognises students' readiness, educators, curricula, and technology implications. It aims to contribute to long-term experience and provide adequate support for the university curriculum.

Keywords
Smart technology, innovation, pedagogy, Mandarin language

1. Introduction
The internet has revolutionised communication, which is now a consumer choice as a daily intermediate medium. The emergence of Web 2.0 in the twenty-first century is a historic revolution for the internet. The internet enables
users to interact across borders, but it also poses new privacy and security challenges. The internet has changed consumers' lives in business, education, government, health, and human relations. The development of the internet has been transformed into mobile and cyberspace. Users no longer spend time on the computer screen; instead, they keep in touch with the virtual world using smart devices everywhere and anytime. Therefore, we must study the history and development of the internet and the Web's existence. The internet came into existence in 1972. The internet's growth has made it possible for users to surf the internet quickly and without limitations. A World Wide Web (WWW) was created in 1991, where the webserver was successfully connected to the network. The Web is a group of websites stored on a web server and linked directly to a computer via the internet. The website's contents including video, audio, digital photos, text pages, and others. Users can use devices such as computers, laptops, mobile phones to access the website.

The Web has gone through several evolutionary stages. Web 1.0 is the first evolution. Most web users at this level are likely to have access to information. Users can only read material but cannot upload it. Web 1.0 is usually used as a personal website, and a fee based on the page viewed is charged to users. Web 2.0, known as the Participative and Social Web. It emphasises the generated content, the use, and the uninterrupted interoperability of users' content. Users are free to customise the website according to their preferences. For instance, on social media, users can interact and work together as content creators in a virtual community. Web 3.0 is a technology network that offers new and efficient methods to help computers organise and draw conclusions from online data. Users can convert the Web to a database where multiple views can be found on the same Web.

Furthermore, Web 4.0 is a paradigm based on various models, technologies, and social relationships. Such a Web can register and record all the daily routines of users. In short, it helps users to find information, save search history, or gather users who are searching for the same information from different locations, times, and situations. It is also known as an smart Web or Smart Web, where the software agent can represent the user when communicating with the software agent to solve something. This technology could respond by detecting the user's face or the user's attitude. The data that has been detected can then provide suggestions, solutions, or help with the user's psychological problems. Overall, the Internet and the Web are intertwined and evolving parallel with the changing industrial revolution of human life.

1.2 Industrial Revolution
How the evolutions of the internet and the Web affect industries? For that reason, the understanding of the evolution of industry must be grabbed. Industry 1.0 is positioned for the use of steam engines. Industry 2.0 focuses on electricity, Industry 3.0, where information-oriented industries and Industry 4.0 involves the Internet of Things (IoT) in almost every aspect of human life (Kurniawati, 2018). IR 4.0/5.0 is a blurred image of the real, digital, and biological world. The combination of artificial intelligence (AI), robotics, the Internet of Things (IoT), three-dimensional printing, genetic engineering, quantum computing, and other technologies are forces for many products and services in modern life. For example, GPS systems recommend the fastest route to destinations, voice-activated virtual assistants such as Apple Series, personalised Netflix recommendations, and the ability of Facebook to recognise the face of the user and tag the users in a photo of their friend.

IR4.0 has a significant impact on human life, particularly in the education sector, which poses an essential contributor to the national economy. For example, the Institute of Public Higher Education is responsible for producing high-quality human capital (Devi, Annamalai, & Veeramuthu, 2020). The study's findings indicate that graduates who want to compete in the labour market need to equip themselves with the Industrial Revolution skills. Currently, educators need to understand and integrate flexible and interactive digital technology into the delivery style to meet the learning style of students of the new millennium. In brief, to achieve educational aspirations with the IR4.0 revolution concept, educators need to strengthen their technical knowledge and competence in their operations.

The industrial revolution, the sophistication of smart technology, has influenced human style and how we communicate and learn. Education, especially world languages, has received many innovations based on mobile technology. The approach to language acquisition is changing with the development of smart technology. However, to what extent has innovation based on IR 4.0 technology achieved its objectives. Moloney and Xu (2016) asserted that innovation in language education could only happen through efforts to diversify pedagogy, understand students and educators, and comprehend the implications of teaching new communication in different contexts. Therefore, exploring related issues is appropriate to strengthen educators' knowledge and student language acquisition.

1.3 The Development of Mandarin Chinese Instruction
After looking at the internet and web evolution and the industrial revolution, it is indispensable to comprehend how these things affect Mandarin Chinese instruction. Chinese's strict education system and high respect for teachers
have made the teacher-centred approach have long been favoured in Mandarin language education, especially in China for a long time. Students receive information passively from teachers and rarely engage in group activities or challenge the knowledge provided. This one-way approach allows educators to focus on delivering lessons. Nevertheless, twenty-first-century education has transformed into innovation practices that integrate the latest technology and focus on student-centred approaches (student-led approach). Educators play a role as facilitators and mentors. Students act as active contributors to group interactions. Students are encouraged to ask questions and challenge ideas and concepts. The examination's success is still considered necessary, but with a method that emphasises deep understanding, creative and critical thinking. Such a method equips students with practical knowledge and skills in an academic setting. Hence, this study examines effective means of learning through mobile technology, the extent to which the transition from teacher-centred teaching to student-centred learning has taken place.

2. Methodology

This study was analysed based on the five-step approach proposed by Khan, Kunz, Kleijnen, and Antes (2003). Such approaches include: (i) formulating review questions, (ii) identifying relevant studies, (iii) evaluating the quality of the study, (iv) summarising evidence, and (v) interpreting the findings, guiding the data collection process. Sources of information collected include scientific journals, conference proceedings, books, and book chapters. The research involved searching the databases of Scopus.com and Mendeley.com. The terms Mobile Application, MALL (Mobile-Assisted Language Learning), Technology Integration, and Acquisition of Mandarin were used (Dinçer, 2013). While Tekedere (2016) stated that two studies were sufficient if a stable model was used in meta-analysis studies. Tekedere (2016) also claimed that although the number of studies varies by subject, the number of studies in practice was at least eight. Due to a combination of empirical study results and quantitative data, it improved the study's validity (Ellis, 2012). As a result, this study used a five-step approach, and a total of 13 studies in the practice of Mandarin language were discussed.

2.1 Smart Technology in Mandarin Chinese Acquisition

Studies related to language learning with Mobile-Assisted Language Learning (MALL) between 2008 and 2018 has demonstrated that mobile devices in language learning are more effective than conventional methods (Chen, Chen, Jia, & An, 2020). Computer-based learning (e-learning) relates to learning in front of a computer, even if it can happen outside the classroom. Mobile learning (m-learning) refers to learning that can occur anywhere and anytime, formally, informally, privately, in groups, face-to-face or virtually. In a word, learning goes beyond the classroom. Recently, all these mobile devices, smart technologies such as smartphones, tablets, smartwatches, and smart glasses, can work with touch, voice, or body language. Learning can be implemented with various advanced functions of innovative technology functions, such as QR codes, augmented reality (AR), and place-sensitive functionality (Reinders and Pegrum 2017). Nowadays, the popularity of smartphones has influenced educators, and various parties are committed to providing application software and tools for educational purposes.

Scholars in Mandarin have widely studied Web 2.0. Among the studies related to smart technology studies as a teaching tool are smartphones that facilitate Chinese orthography/ characters (Wong & Hsu, 2016). Increased writing skills in Chinese/ Hanzi writing (Eubanks, Yeh, and Tseng, 2017), using the MOSE platform reduces language errors. Still, the learning does not depend on language experience when performing language assignments outside the classroom (Lan & Lin, 2016). In contrast, the software-based smart technology study takes inPleco applications (He and Yang, 2016). Researchers noticed that it improves the efficiency of reading activities. Yang & Yin (2018) observed that language experience and attitudes do not affect learning outcomes in their study on WeChat. Xu & Peng (2017) and Jiang & Li (2018) remarked that the use of WeChat with the guidance of native speakers enhances students' oral skills. Likewise, WeChat software provided with the Chinese language resources can be integrated into teaching according to students' language level (Jin, 2018). The MyCloud application, consisting of a Mobile dictionary, My e-Textbook and MyCLOUDNet, builds up students' tendency to convey meaning proactively and spontaneously when interacting with people near them (Wong, King, Chai, & Liu, 2016). The study of Ying, Ruomei, & Susilo (2020) discovered that the Smart Word application (Smart Word) provides learning comfort in time and place. Besides, Hung, Chen, & Huang (2017) viewed that learning with the Learn Mandarin (Learn Chinese Interface) application is more accessible and attracts students but does not contribute to self-confidence.

Furthermore, Web 3.0-oriented applications such as three-dimensional (3D) virtual environment applications can enrich the learning experience and autonomy of Chinese language students and can be implemented at the university level (Wang, Grant, & Grist, 2020). In comparison, Hung et al. (2017) learnt that the Augmented Reality
(AR) graphics book offers practical methods and hands-on learning to explore and learn about the learning contents. The study results suggested that the application of AR is very interesting for students compared to picture books and physical interaction. In summary, this exploration found that the number of Mandarin Smart Technology web-based integration studies is more than just Web 3.0 technology. Web 2.0 usage studies include smartphones, iPads, mobile devices, ‘MOSE’ platforms, WeChat, MyCloud, Pleco software, Smart Word, and Learn Chinese Interface. Simultaneously, web-oriented studies are keen on the use of three-dimensional virtual environment applications and AR graphics books. The summary of the significant findings is summarised in Table 1 below.

Table 1: Summary of significant findings – technology integration and Mandarin instruction

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<tr>
<th>Era</th>
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<th>Major findings</th>
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3. Discussion

Today, smart technology-oriented learning has become the primary strategy for learning Mandarin (Qian, Owen, & Bax, 2018). The integration of smart technology attracts, accelerates, simplifies, and enriches the student experience, particularly in learning Mandarin, a complex language. For instance, it facilitates the learning of the complex Chinese characters and the understanding of many proverbs. Moreover, students have made fewer mistakes when communicating with smart technology and virtually receiving additional help from their peers. Native speakers can
also be involved in improving the oral skills of students. Ying confirmed that technological tools are needed to enable students to learn on their own at a convenient time and place. This objective is consistent with the principle of personalised learning in the twenty-first century, where students can learn according to their level of ability. Studies related to technological equipment such as digital pens and blended learning have shown that the intervention promotes differentiated learning and positively impacts student achievement (Chen et al., 2016; Ghysels and Haelermans, 2018).

However, research on who and what kind of benefits/output of this approach is still lacking and needs to be developed, particularly for Mandarin instruction (Van Klaveren, Vonk & Cornelisz, 2017). The limitations of technological practice are the deficiency of incomprehensive training and speaking confidence that cannot be developed. Studies also have indicated that language experience and attitudes do not have an impact on student output. It illustrates that technological tools can produce meaningful learning, even though they are not free from weaknesses. In other words, some skills cannot be achieved by technological sophistication. Therefore, Chen et al. (2020) proposed that pedagogical studies should be expanded, although the smart technology approach is more effective than conventional approaches. Educator competence in the design, selection, and adaption of applications or technologies to the existing curriculum is the learning success factors integrated with smart technology (Chua, Tajudin & Soon, 2020). Wang et al. (2020) recommended that task-oriented language learning methods (Task-Based Language Learning / TBLL) be used for teaching and learning activities to increase this approach's effectiveness. Task-Based Language Teaching (TBLL) is becoming increasingly popular in teaching a foreign language. Moreover, Jiang & Li (2018) argued that language assignments using native-speaking resources and smartphone technology could boost students' intrinsic motivation, where smartphones can meet new students' desire to have virtual conversations with native speakers.

As for the Augmented Reality (AR) study, Hendrys Tobar-Muñoz, Silvia Baldiris (2017) suggested that AR technology should be combined with game-based learning. This combination allows users to play with natural objects such as maps, equipment, and books and creates an atmosphere of playing while learning (Mouri & Ogata, 2015). This learning can further enhance learning outcomes based on smart technology. Even a lot of research has been done on technology-based innovation. It is still a lack of study that explores the willingness and understanding of students and educators with the implications of teaching in different contexts. These topics should focus on future research to produce a model of teaching and learning Mandarin language-oriented smart technology that can achieve optimal learning outcomes. This opinion aligns with Wang et al. (2020) that further research is needed to develop "consistently successful premises" where successful and effective interactive elements can be integrated into a university's Chinese courses.

4. Conclusion
In conclusion, the Internet and Web technology significantly impact human life, specifically in learning styles. Nowadays, technology usage has become widespread, and educators who face the new generation of the millennium need to be proactive and diversify how technology is integrated to achieve effective and sustainable learning outcomes. In short, the teaching and learning of Mandarin have made several innovations geared towards the use of smart-technology applications in line with global demand. Educator-centred teaching is increasingly turning to student-centred teaching. The issue of how the mastery of pedagogical perspective should be attended. This issue is due to smart technology integration planning that considers students' readiness, educators, curriculum, and technology implications, which will lead to long-term experience and sufficient support for the university's Chinese curriculum development.

References


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Biographies
Nurul Ain Chua Binti Abdullah is currently working at the Centre for Fundamental Studies and Continuing Education, Universiti Malaysia Terengganu. She is doing individual action research in teaching and learning of foreign language (Mandarin).

Goh Ying Soon is a senior lecturer, and he currently teaching Mandarin as the third language to non-native learners in MARA University of Technology, Malaysia. He is a member of the International Society for Chinese Language Teaching. He has taught Mandarin at the primary, secondary and tertiary level for more than 25 years. He has been actively presenting papers at national and international conferences. His research interests are on using educational technology in Mandarin teaching and learning, web-based instruction, translation, etc.

Azza Jauhar Ahmad Tajuddin is a PhD holder and works as a senior lecturer at the Center for Foundation and Continuing Education (PPAL), Universiti Malaysia Terengganu, Malaysia. He has published numerous articles Scopus/ WoS indexed. Her research interests are in the areas of education, language learning, curriculum and linguistic.

Che Mohd Zaid is a PhD holder and works as a senior lecturer at the Center for Foundation and Continuing Education (PPAL), Universiti Malaysia Terengganu, Malaysia. He has published seven articles Scopus/ WoS indexed. He earned her PhD in Education from the University of Malaya, Malaysia, specialising in the learning environment. His research interests are in the areas of education, language learning environment, curriculum and linguistic.

Azlina Musa is a senior lecturer at the Center for Foundation and Continuing Education (PPAL), Universiti Malaysia Terengganu, Malaysia.

Ismar Liza Mahani Ismail is a senior lecturer at the Center for Foundation and Continuing Education (PPAL), Universiti Malaysia Terengganu, Malaysia.

Najihah Binti Abdul Mutalib is a senior lecturer at the Center for Foundation and Continuing Education (PPAL), Universiti Malaysia Terengganu, Malaysia.

Jumadiil Saputra is a PhD holder and works as a senior lecturer in the Department of Economics, Faculty of Business, Economics, and Social Development, Universiti Malaysia Terengganu, Malaysia. He has published 125 articles Scopus/ WoS indexed. As a lecturer, he has invited as a speaker in numerous universities, the examiner (internal and external), the reviewer for article journal and proceeding, the conference committee, journal editorial board, and others. He is a professional member of the International Business Information Management Association (IBIMA), Ocean Expert: A Directory of Marine and Freshwater Professional, and Academy for Global Business Advancement (AGBA). His research areas are Quantitative Economics (Microeconomics, Macroeconomics, and Economic Development), Econometrics (Theory, Analysis, and Applied), Islamic Banking and Finance, Risk and Insurance, Takaful, i.e., financial economics (Islamic), mathematics and modelling of finance (Actuarial). His full profile can be accessed from https://jumadilsaputra.wordpress.com/home-2/.