Chinese Lesson Study: its history, development, and implications

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Abstract

This paper provides a holistic portrayal of Chinese lesson study (LS). It includes the historical and cultural traditions of Chinese LS, the mechanisms of Chinese LS, the major features of Chinese LS in comparison with Japanese LS, and its recent development and further directions. The implications of Chinese LS for the development of LS internationally are discussed.

Keywords: Lesson study. Chinese Lesson Study. Teaching Research System. Teacher Professional Learning. Improvement Science.

Lesson Study China: su historia, desarrollo e implicaciones

Resumen

Este artículo presenta un retrato holístico de Lesson Study Chinese (LS). Incluye las tradiciones históricas y culturales del LS chino, los mecanismos del LS chino, las características principales del LS chino en comparación con el LS japonés y su desarrollo reciente, y otras direcciones. Se discuten las implicaciones del SL chino para el desarrollo del SL a nivel internacional.

Palabras clave: Estudio de lecciones. Lección de estudio chino. Sistema de Investigación Docente. Formación Profesional Docente. Ciencia de la Mejora.

Lesson Study Chinesa: sua história, desenvolvimento, e implicações

Resumo

Este artigo apresenta um retrato holístico da Lesson Study Chinesa (LS). Inclui as tradições históricas e culturais da LS chinesa, os mecanismos da LS chinesa, as principais características da LS chinesa em comparação com a LS japonesa e seu desenvolvimento recente e outras direções. As implicações da LS chinesa para o desenvolvimento da LS internacionalmente são discutidas.

Palavras-chave: Lesson study. Lesson Study Chinesa. Sistema de Pesquisa do Ensino. Aprendizagem Profissional do Professor. Ciência do Aperfeiçoamento.

Introduction

Based on the TIMSS video study, which examined nationally representative eighth-grade mathematics classrooms (81 in the US, 100 in Germany, and 50 in Japan), Stigler and Hiebert (1999) revealed the high-quality mathematics teaching in Japan (90% of classrooms studied were rated as medium and high) in comparison with the classrooms studied in Germany (66%) and in the US (11%) and identified a unique Japanese pedagogical approach of teaching mathematics through "structured problem-solving." They argued that teaching is a system and a cultural activity, and the unique Japanese teacher professional development (PD) approach, coined as Lesson Study (LS, jugyou kenkyuu plan., 授業研究) helps develop teachers' capacities needed for teaching through problem-solving nationwide. LS typically includes a collaborative study of teaching materials, joint design of a lesson, and teaching of the lesson observed by colleagues with a post-lesson debriefing followed by a revision of the lesson.

In Japan, LS has been in place with multiple models nationwide for over a century that has significantly contributed to the improvement of math and science education (Lewis, 2015, 2016; Makinae, 2019). Thanks to the seminal work by Stigler and Hiebert (1999), LS has been adopted in the US since the 1990s (Lewis; Tsuchida, 1998) and then has spread globally (Huang et al., 2019). The positive effects of Japanese LS on promoting teacher professional learning, improving student learning outcomes, and building professional learning communities (Huang & Shimizu, 2016; Lewis, 2016; Lewis & Perry, 2017; Willems & Bossche, 2019) have been well-documented, although there are various challenges of adapting LS in other countries (Fujji, 2016; Huang & Shimizu, 2016).

Recently, Chinese LS has occurred in the LS community (Huang & Shimizu, 2016; Huang et al., 2017). Educators may wonder whether this is an adapted Japanese LS or whether Chinese LS has unique features. This paper aims to provide a brief introduction to Chinese LS: its historical development, mechanisms for supporting LS, and its features in comparison with the Japanese LS. The paper ends with a discussion of the implication of the Chinese LS for the international LS community.

1. Chinese LS: A brief history

The outstanding performance of Chinese Mainland students in mathematics and science on the Programme for Student Assessment (PISA) (OECD, 2013; 2019) has prompted

international scholars to study mathematics education and mathematics teacher education in China (FAN ET AL., 2015; LI; HUANG, 2018). The Shanghai teaching approach has been characterized as mastering teaching and learning through variation and includes the five big ideas of coherence, representation and structure, mathematical thinking, fluency, and variation (HUANG ET AL., 2021; HUANG; LI, 2017; NCET, 2017). Several Shanghai lessons have been recommended as exemplary lessons in a popular book, *Mathematics Mindset* (BOALER, 2018). Thus, how to prepare and ensure teachers can teach mathematics in such a way has become an interesting question.

There is a job-embedded, hierarchical PD system of teaching research activity in China. It includes studying teaching materials, jointly planning a lesson, teaching the lesson, observing the lesson, and having a post-lesson discussion as a core component (HUANG ET AL., 2017; YANG, 2009). The Chinese PD approach, focusing on examining and polishing a lesson aligned with reform-oriented teaching, was initially coined as Keli (exemplary lesson) study (HUANG; BAO, 2006). Recently, it has been theorized as Chinese LS through two special issues included in the International Journal for Lesson and Learning Studies (see HUANG ET AL., 2017; FANG ET AL., 2022).

From a historical perspective, Li (2019) illustrated how Chinese LS has evolved through three major stages and finally developed its own characteristics. In the first phase (1896-1949), the initial forms of Lesson Study activities were first introduced and practiced. During that period, the schools affiliated with normal universities provided a venue for pre-service teachers' teaching practicum experience in which (1) experienced teachers observed and provided feedback on lessons taught by student teachers and (2) experienced teachers demonstrated how to teach, to student teachers. These two types and their variations continue to be practiced in schools in China today.

In the second stage (1949-1999), adapted from the former Soviet Union, the Chinese government officially established a nationwide teaching research group (TRG) system. Teaching Research Groups focused on three main themes: (1) In-depth analysis of textbooks and other instructional materials and pedagogy; (2) Collective lesson planning by teachers in the same group; and (3) Observation of an exemplary lesson taught by expert teachers or an experimental lesson involving new teaching strategies; teaching or observing a public lesson,

followed by the audience commenting on the lesson; mutually observing lessons taught by other teachers in the same group, providing feedback.

In the third stage (2000-), to address the challenges of implementing new curriculum, teacher educators developed their own style of LS by adopting ideas of community of practices (WENGER,1998) and Japanese LS. The most recognized work was done by the Action Research Project team at Qingpu County in Shanghai (WANG; GU, 2007). Based on over 20 years of teaching experiments and empirical research in mathematics classrooms, the project team formulated an Action Education model for teacher professional development that incorporates LS as the main platform for teacher learning, planning, teaching, reflections, and new behaviors (GU; GU, 2016; HUANG; BAO, 2006). It is called "three foci (teacher belief, gaps identification, and adaptive change) with two rounds of reflections between the iterative research lesson planning for improvement (三关注, 两反思)" (WANG; GU, 2007, p. 37).

More specifically, a teacher starts with planning a lesson aiming at making visible his or her own existing teaching beliefs and behaviors by reflecting on feedback from colleagues and identifying the gaps in what the reform requires. Then the teacher redesigns and teaches the lesson aiming at gaining lived experience of the new standards, ending with reflecting, redesigning, and teaching it again based on colleagues' observation feedback and evidence of student learning in order to arrive at a new behavior phase. Gu and colleagues' work also marked the first time that researchers were called upon to work with schools to provide expert guidance (zhuanjia yinglin, 专家引领) (HUANG; BAO, 2006).

The recent development of Chinese LS within the context of 21st-century competency-oriented curriculum reform is discussed in a recent special issue on Chinese LS (FANG ET AL., 2022). In the following sections, I will provide more details about the features of Chinese LS and why and how Chinese LS works in China.

2. Underpinnings of Chinese Lesson Study

Chinese LS has played important roles in implementing curriculum reform and improving mathematics instruction over decades (WANG; GU, 2007; HUANG, HUANG ET AL., 2019). In this section, the reasons why Chinese LS works are explored from multiple perspectives.

2.1 A cultural perspective

From a cultural perspective, Chen (2017) argues that the following three core cultural orientations frame the Chinese LS.

First, unity of knowing and doing (知行合一) rather than conceptual explication is behind teacher knowing and understanding through embodied actions and practical discourse. Ontologically, in Chinese culture, knowing and doing are integrated.

Second, practical reasoning (实践推理) drives the deliberate practice of repeated teaching through group inquiry and reflection. Epistemologically, knowledge of good teaching is not so much talked about in verbal concepts as enacted in teachers' actions in deliberate practice through critical inquiry and reflection. As a Chinese saying states, "Proficiency comes from familiarity" (熟能生巧).

Third, a tendency to emulate those better than oneself (见贤思齐) motivates teachers to learn from "good" exemplars of expert teachers.

Methodologically, it is believed that watching model teaching, practicing for "*making perfect,"* and learning from making errors are valuable opportunities for teachers. This corresponds to the statements: "doing things" cannot be separated from "being humane," and "respecting virtues" should go hand in hand with "learning knowledge."

These cultural values about teacher professional learning could help explain why in Chinese LS, repeated teaching of the same topic, developing an exemplary lesson, and knowledgeable others' involvement throughout the LS process are emphasized.

Moreover, Li (2019) argues that the following three principles and practices are crucial for understanding the nature of Chinese LS: (1) respecting and learning from masters and experts; (2) teaching and learning by integrating profound theory and deliberate practice, and (3) learning taking place among learner peers through mutual observation and discussion.

It is argued that these cultural roots could help us better understand the nature and features of Chinese LS (CHEN, 2017; LI, 2019). Yet, some unintended consequences should be noticed. For example, some teachers have taken a utilitarian or opportunist approach, participating in LS activities mainly for the sake of winning a contest or promotion, social status, and financial incentives (LI, 2019). Furthermore, it is often difficult to agree upon the criteria for "good" lessons during LS amid ongoing curricular reforms (CHEN, 2017).

2.2 An institutional perspective

From an institutional perspective, both a teacher professional promotion system and an associated teaching research system are fundamentally important for ensuring Chinese LS be implemented at scale. *The professional ranking and promotion system*, established in 1993, has evolved to support teachers' professional development.

There are three levels of professional titles: senior (高级), intermediate (中级, Level 1), and primary (初级, Level 2 &3).

For each level, political, moral, and academic qualifications are specified. In addition, there are specific titles for honoring teachers with excellence in teaching, research, and leadership, such as "exceptional teacher," which is equivalent to university professor status (HUANG ET AL., 2016a), or "master teacher" and "subject leader" (CRAVENS; DRAKE, 2017). This system not only specifies components of teacher professional expertise but also provides incentives (the salaries are associated with different professional levels) and a culturally supported mechanism for teacher professional development (LI ET AL., 2011).

There is a *teaching research system* supporting teacher professional development (CHEN, 2020; RICKS; YANG, 2013). Teaching research (Jiaoyan) is a special term that refers to various activities of professional development at different levels (school, district, city, or national), and is organized by teaching research groups (school-based) and institutes (Jiaoyan Jigou).

The teaching research system, initially established in 1956 (WANG, 2013), has evolved into a hierarchical system with school, district, county, city, province, and national levels (YANG, 2019). Different departments, including educational bureaus, educational science research academies, and curriculum development centers at both national and local levels, are responsible for teaching research activity at different levels. Their major responsibilities include (1) guiding teaching research, (2) overseeing teaching administration in schools on behalf of educational bureaus, (3) providing consultation for educational authorities, (4) mentoring the implementation and revision of new curricula, (5) building the bridge between modern educational theories and teaching experiences, and (6) promoting high-quality classroom instruction (HUANG ET AL., 2016b).

There are more than 100,000 teaching researchers (inclusive of other disciplines) working in teaching research institutes (WANG, 2013). The teaching research specialists play

multiple roles, including (1) interpreting opinions regarding the implementation of teaching plans, syllabi, and materials based on local contexts; (2) providing evidence and suggestions on decision-making for local education authorities; (3) organizing a variety of teaching research activities at different levels; and (4) helping teachers study teaching materials, implement teaching schedules, and improve their teaching efficiency.

Specific requirements for recruiting teaching research specialists have been set by the Ministry of Education and are further specified by local education authorities (HUANG ET AL., 2012). In general, a teaching research specialist must be an excellent teacher with good teaching research ability and leadership.

Within the teaching research system, many teaching research specialists and educational researchers, who have excellence in teaching and doing educational research and with needed skills in facilitating teaching research activity, could serve as knowledgeable others for facilitating LS. Some advanced teachers are selected to serve as subject leaders at district or city levels to lead in carrying out school-based teaching research, including Chinese LS. These subject leaders help teachers interpret the curriculum standards, demonstrate their own teaching, mentor other teachers, and decode instructional expertise by comparing teaching conducted by experts and regular teachers.

Chinese LS and district research projects, with the support of subject leaders (or/and knowledgeable others from universities), have made curriculum reform transparent for teachers to ensure their learning to teach reform-oriented lessons (CRAVENS; WANG, 2017; FANG, 2017).

3. Studies on Chinese LS

Similar to Japanese LS, Chinese LS has played roles in improving mathematics teaching (HUANG ET AL., 2011), promoting students' outcomes of learning (HUANG ET AL., 2016b), developing both teachers' and specialists' professional knowledge and skills (HUANG; HAN, 2015; HUANG, ZHANG ET AL., 2017), implementing reform/innovative ideas (HUANG, HUANG ET AL., 2019; ZHAO ET AL., 2022), and building connections between research and practice (HUANG ET AL., 2016b).

In Huang and Li's (2009) study, with the aim of developing exemplary lessons to supplement the textbook, LS groups from a school, a district, and a city, supported teachers in developing lessons that demonstrated new curriculum-oriented instruction.

Huang et al. (2011) further documented how teachers could develop their instructional expertise by developing exemplary lessons and collaboration through LS. Huang et al. (2016b) explored how an LS informed by theories of learning trajectory and variation pedagogy could promote students' conceptual understanding of the mathematical algorithm of the division of fractions. Similarly, Huang, Zhang et al. (2019) revealed that theory-informed LS could develop students' ability to solve word problems.

Regarding the effect of LS on curriculum reform, both Huang and Huang et al. (2019) and Zhao et al. (2022) documented how innovative ideas introduced in curriculum standards could be implemented in the classroom effectively through iterations of LS. Concerning the learning of knowledgeable others (e.g., mathematics teaching research specialists in China), Huang and Han (2015) documented how mathematics specialists and teachers co-learned through boundary crossing during LS.

Huang and Zhang et al. (2017) detailed what knowledge and skills are needed to be specialists and how specialists develop their professional knowledge. With regard to the roles in linking theories to practice through Chinese LS, Huang et al. (2016b), Han et al. (2019), and Zhao et al. (2022) documented how a certain theory (e.g., learning trajectory, variation pedagogy) could inform the LS process and promote student learning outcomes.

Recently, Huang et al. (2021) portrayed teachers' expansive learning process through Chinese LS. In the journal special issue on Chinese LS and its adaptation in other countries (HUANG ET AL., 2017), it was argued that Chinese LS is a deliberate practice for developing instructional expertise, a research methodology for linking research and practice, and an improvement science for instruction and school improvement system-wide.

To understand recent developments of LS in China, a new journal special issue revisits the roles of LS within the context of competency-based curricula (FANG ET AL., 2022). This special issue argues that LS in China continues to serve as a powerful platform to support change in teaching and reveals a new feature of Chinese LS, namely, research-practice partnerships (RPPs) in LS (FARRELL ET AL., 2022), where researchers, who are university faculty

members, support teachers to implement competency-based (*hexing suyang* 核心素养) curriculum reform through boundary crossings (ENGESTRÖM; SANNINO, 2010).

From the lens of learning at the boundary of research-practice partnerships (RPPs), the features of Chinese LS are highlighted in three major themes: (1) the role of university-school partnerships in meeting the new demands of key competency reform; (2) resourceful tools, strategies and structures to support boundary crossing for teachers; and (3) roles and relationships for mutual learning in university-school partnerships.

Thus, it urges the need to redefine Chinese LS to engender versatility and hybridity and to enlist mutual learning relationships in future university-school partnerships.

3.1 Comparisons of Japanese LS and Chinese LS

Embedded in a nationwide, hierarchical teaching research system (school-based, district-based, city-based, province-based, nation-based), Chinese LS includes multiple modes with different purposes at different levels as well.

In general, various types of Chinese LS focus on polishing the research lesson based on classroom observation and collective reflection and emphasize the LS product as "public lessons" or "exemplary lessons" (HUANG ET AL., 2017; YANG, 2019). There are "report lessons" for novice teachers to demonstrate their professional growth, "exemplar lessons" for expert teachers to demonstrate reform-oriented good practice, and "contest lessons" for winning awards for excellence in teaching (HUANG ET AL., 2017).

There are similarities between Japanese and Chinese LS regarding the focus on examining and reflecting upon classroom practice and the nature of job-embedded and nationwide PD activity, with each having a long history and a cultural and institutional support system (LEWIS, 2016; Li, 2019; YANG, 2019).

Yet, some essential differences between Chinese and Japanese LS are identified.

Especially the essential components of Chinese LS are: (1) repeated teaching of the same topic, (2) focusing on both content and pedagogy, (3) exemplary lessons as products of LS, and (4) the involvement of knowledgeable others throughout the LS process (HUANG ET AL., 2017; LI, 2019).

First, for a long time, Chinese LS has been content-focused, oriented to developing the best teaching strategies for specific subject contents for student learning, while Japanese LS was regarded as focusing on general and long-term education goals.

Second, there are various kinds of lesson studies for teachers at different stages of their professional development in China, with a focus on demonstrating and/or developing exemplary lessons to demonstrate effective teaching. Yet, the Japanese model focuses more on the process of teacher learning than the product of a "perfect lesson."

Third, rehearsal teaching is repeated multiple times until the teachers involved feel satisfied with the goals they set out to achieve, while Japanese teachers might or might not repeat the teaching with the improved lesson.

Fourth, knowledgeable others are involved throughout the entire process of Chinese LS, while in Japanese LS, knowledgeable others may also be involved, but not necessarily or not throughout the entire process.

4. Further directions of Chinese LS

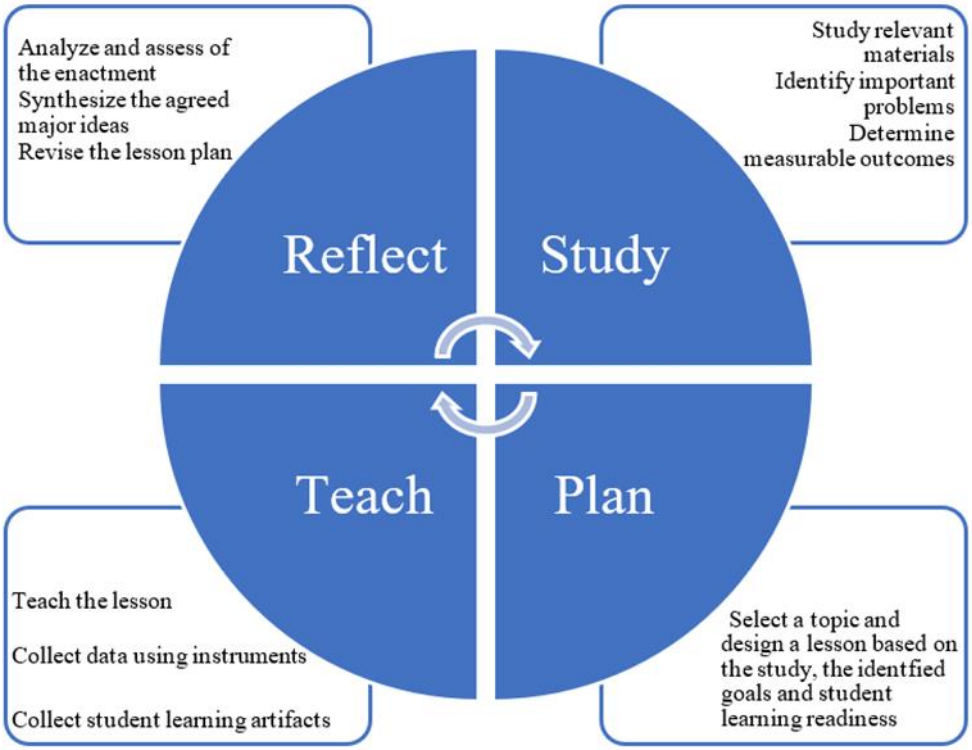
As a traditional and powerful teacher professional development approach, Chinese LS has to cater to the needs of uncharted challenges in the artificial intelligence technology-mediated education era.

By recognizing weaknesses of Chinese LS, such as focusing on teacher performance rather than student thinking and focusing on reflection based on experience rather than analytical analysis, several strategies could be adopted to improve the LS process.

First, theoretical notions such as learning trajectory (SIMON, 1995) and variation theory (GU ET AL., 2004; HUANG; LI, 2017) could be used as guiding principles during the LS process.

Second, the LS process could be carried out as disciplined inquiry (BRYK ET AL., 2015) by adopting the ideas (pre, post- tests; intended, enacted, and achieved goals of learning) from the learning study (MARTON; PANG, 2006) and investigating a focus-group of students during LS (DUDLEY, 2012). Thus, the LS process could be enriched, as displayed in Figure 1.

Figure 1 - Enriched Chinese LS process



Source: Adapted from Lewis *et al.* (2019)

Within the LS cycle, it is crucial to identify important problems to address and how to measure the outcomes of solving the problems. Before planning the lesson, it is important to understand student learning readiness through a pre-test and/or an interview with focused students. During teaching and observation, it is necessary to use certain instruments to capture critical teaching moments and student learning evidence. Immediately after the research lesson, a post-test and/or interview are needed to collect student learning outcomes and students' perceptions. During debriefing, based on the collected data, analytical analysis results should be incorporated for revising the lesson plan for the next cycle of LS.

With regard to promoting Chinese LS systemwide, some ideas from improvement science (BRYK ET AL., 2015) and networked improvement community (RUSSELL ET AL., 2017) could be adopted.

There are six core principles of improvement.

The first is to make the work problem-specific and user-centered. It starts with a single question: "What specifically is the problem we are trying to solve?".

Second is that variation in performance is the core problem to address. The critical issue is not just what works but rather "what works, for whom, and under what set of conditions."

The third core principle is seeing the system that produces the current outcomes. It is hard to improve what you do not fully understand. It is important to understand how local conditions shape work processes and make hypotheses for change public and clear.

Fourth, we cannot improve at scale what we cannot measure. It is important to embed measures of key outcomes and processes to track if improvement occurs.

The Fifth is to anchor improvement in disciplined inquiry. Engaging rapid cycles of *Plan, Do, Study, Act (PDSA)* makes learning faster and improvement quicker. It is not a problem that failures may occur, but it is a problem if we fail to learn from failures.

The last core principle is to accelerate improvements through networked communities. We can accomplish more together than even the best of us can accomplish alone.

An examination of PDSA cycles (core principle 5) (See Figure 2) shows that the PDSA and LS cycles are nicely matched. At each phase of PDSA, there is a detailed description of what needs to be done.

For example, to plan, we analyze the cause of the problem within the system. To act, we have to make explicit the measurable outcome and hypothesis and have a theory in action (protocol). In the context of LS, it is crucial to measure what students learn and how certain types of intervention link to learning outcomes.

Figure 2 - Plan-Do-Study-Act (PDSA) circle

Source: Adapted from Bryk *et al*. (2015)

The PDSA cycle could be repeated to continuously hypothesize and test the improvement. Regarding LS context, building on the product of a cycle of LS (lesson plan and video lessons, measurement, and learning evidence), further cycles of LS could continue to address the identified problem. Thus, this type of LS could be conducted across schools in the same district or across districts.

5. Implications of Chinese LS for LS Globally

Rooted in Chinese cultural values and supported by the teaching research system and teacher promotion system, Chinese LS has contributed to the improvement of mathematics and science education nationwide over the decades. Meanwhile, Chinese LS itself has evolved and developed into new forms and connotations to meet teachers' professional development needs in changing contexts. The continuity and change keep the Chinese LS a dynamic and vital professional development vehicle for teachers to meet changing challenges. At the same, the practice and development of Chinese LS may provide insights into teacher professional development in other countries.

The key features of Chinese LS, such as iteration, the involvement of knowledgeable others, focusing on both process and product, and linking theory and practice, may provide insight into the enrichment of LS around the world. For example, the repeated teaching of the same content (similar to design-based implementation research) (FISHMAN ET AL., 2013) has been adopted by UK-research LS, which focuses on using multiple cycles of LS with a deep investigation of a group of focus-students.

The involvement of knowledgeable others (or facilitators) in the LS process has been recognized as one of the important factors ensuring the success of LS (TAKAHASHI; MCDOUGAL, 2016; SELEZNYOV, 2019). Focusing on both process and products of LS is critical for scaling up LS and building a networked improvement community (MORRIS; HIEBERT, 2011).

However, when adopting lessons originating in Asia to other countries, cultural transposition (cultural beliefs, institutional intentions) should be considered (BARTOLINI BUSSI ET AL., 2017; RAMPLOUD ET AL., 2022), and necessary modifications need to be made by incorporating local culture and traditions.

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