The Research Landscape of Global Competence: Theory Development, Research Focus and Prospects

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ABSTRACT

Global competence has profoundly affected all fields of education. This paper uses the literature research method to present the current global competence research landscape：First, the concept of global competence has not yet been unified, and presents three orientations: "dimension-oriented", "logical-oriented" and "scope-oriented"; Second, the development of global competence theory has mainly gone through three periods: the transition period from economy to education, the exploration period from theory to practice, and the reflection period from criticism to integration; Third, the current global competence research mainly focuses on two themes: the global competence assessment and the global competence education. The current research shows that the scope of global competence research is gradually expanding, the objects are widely involved, and the method is characterized by the paradigm of quantitative research supplemented by qualitative research. It is suggested that future research should strengthen localization exploration, expand the scope of research, deepen teaching practice and pay attention to the development of students' foreign language skills.

1. Introduction

The growing importance of globalization has had a profound impact on education. Since the beginning of the 21st century, major international organizations and many countries have proposed or implemented competency frameworks for 21st century talents, describing the key competence or core literacy that learners should possess in 21st century, and almost all of these frameworks have included global competence as one of the important dimensions. With the world's first large-scale assessment of young people's global competence levels (PISA) conducted by the Organization for Economic Co-operation and Development (OECD) in 2018, global competence has also attracted a lot of attention around the world. "Global competence" is now seen as an educational imperative by international organizations and national institutions. Therefore, it is necessary to sort out the theoretical development of global competence, to understand the current hotspots and development trends of global competence research, and to provide reference for the localized exploration of global competence.

2. Connotation and structure of global competence theory

Global competence is a dynamic concept that has not yet formed a unified consensus. Currently, there are three main orientations in the academic world for the concept of global competence: The first is "dimension-oriented", for which scholars divide the concept of global competence into different dimensions. For example, Hunter (2004) believed that global competence includes three dimensions of knowledge, skills, and attitudes and it refers to "have an open mind, actively seek to understand the cultural norms and expectations of others, and utilize the knowledge gained to interact, communicate, and work effectively outside of one's environment". The second is "logical-oriented", which summarizes the conceptual theory of global competence into two types: the "logic of elements" and the "logic of action". For example, World Savvy mainly follows the "logic of elements" and indicates that skills, behaviors, attitudes and values are the core components of global competence. While the Asia Society and OECD, on the other hand, follow a "logic of action", which describes the pathways that globally competent individuals should take in their practice, i.e., starting from inquiry into the world, followed by discernment of views and exchange of ideas, leading to informed action (Sun, 2021). The third is the "scope-oriented", which describes global competence into a narrow sense and a broad sense. In the broad sense, some scholars believe that global competence is a kind of core competence based on the comprehensive development of human beings. While in the narrow sense, they tend to

understand global competence as a kind of international competence aimed at fostering global citizenship, which is reflected in students' the international knowledge, international skills, international thinking, international understanding and international implementation (Tang & Yang, 2019). Although scholars have interpreted the theory of global competence in different ways, the key consensus is that they all emphasize the awareness and ability of students to apply their knowledge to solve problems in a variety of real issues of global significance based on an understanding of international knowledge and a willingness to take on more responsibility (Tang & Yang, 2019; Zhou, 2017). In this study, global competence refers to the ability and action of an individual in an increasingly globalized society to continuously improve self-awareness, learn and understand national, cross-cultural and global knowledge, uphold an open and inclusive mindset and a sense of community, effectively and positively interact with the wider world, and work together for the collective well-being of the human society, which is mainly manifested in open and inclusive attitudes and values, comprehensive knowledge and understanding, sound cognitive abilities, and the necessary socio-emotional skills and behaviors.

3. Development of global competence theory

Global competence originated in the United States. After the end of World War II, the United States began to develop international education for national security, and the 1946 *Fulbright Act* marked the beginning of large-scale cultural diplomacy in the U.S. The successful launch of the Soviet Union's satellites in 1957 led to the enactment of the U.S. *National Defense Education Act*, which elevated international education to the level of the national will and contributed to the emergence of international studies and foreign language studies, as well as reflecting the importance that the U.S. attached to the global environment and intercultural exchange, which laid the foundation for the implementation of the global competence education. Since then, the development of global competence theory has gone through three periods:

3.1. From mid-20th century to the 1980s: the transition period from economics to education

Early research on "global competence" focused on the human resources of multinational corporations, and gradually migrated to the field of education. Since the second half of the 20th century, the globalization of human activities has become increasingly evident. While many major global changes and social issues, such as migration, climate change, resource depletion, digitalization, and demographic change have come to the forefront, globalization has also created societies that are more interconnected than ever before. In the 1980s, the United States of America led an initiative to remove government control of financial markets so that businesses could quickly and easily transfer funds to any part of the world it found profitable. This new, borderless global economy allowed not only for the free flow of capital, but also for the free flow of the products and services that this new type of capital flow produced. As international operations among U.S. companies continued to grow and expand, the international human resource management [IHRM] function became an integral part of the strategic plan, a key element of which was to train employees on foreign assignments and foreign managers to be effective managers in their domestic environments (Harvey, 1997). In 1988, the Council for International Educational Exchange (CIEE) explicitly mentioned "global competence" for the first time in its report *Teaching for Global Competence*, marking the period when global competence

education became the new mission of higher education (Sun, 2021). Global competence research in this period mainly reflected the function of education to serve economic development, i.e., to cultivate transnational talents for international business and international exchanges, as well as reflected the instrumental rationality and social value of global competence.

3.2 From the late 20th century to 2018: the exploration period from theory to practice

The theoretical research on global competence in this period is the richest, and can basically be divided into two major types (Teng,zhang,& Hu,2018): The first is the theoretical construction of global competence based on "elemental composition". For example, Richard D. Lambert, Director Emeritus of the National Foreign Language Center, who is considered the father of the global competence Initiative, defined the five components of global competence at the 46th International Conference on Educational Exchange (ICE) as knowledge, empathy, recognition, foreign language proficiency, and task performance (Exchange, York, & NY, 1993). According to Lee Olson and Kroeger (2001), a globally competent person possesses sufficient substantive qualitative knowledge, perceptual understanding, and intercultural communication skills to be able to interact effectively in our globally interdependent world. On the other hand, Hunter (2004) believed that global competence consists of three elements: knowledge, skills and attitudes.

The second is the theoretical construction of global competence based on "action procedures". For example, World Savvy, an American non-governmental organization, classifies global competence into three dimensions: "values and attitudes," "skills," and "behaviors", of which "behaviors" include adherence to lifelong learning and reflection, acceptance of responsibility, adoption of cooperation, etc.(Zhan & Wen, 2018). The Council of Chief State School Officers and the Asia Society of America have proposed that global competence refers to exploring the world, recognizing perspectives, exchanging ideas, and taking action (Mansilla & Jackson, 2012). OECD has been working on global competence research for many years, and has finally integrated the results of two types of global competence research, proposing that global competence "is a multidimensional competency, i.e., the capacity to examine and analyze local, global, and cross-cultural issues; the capacity to understand and appreciate different perspectives and worldviews; and the capacity to interact openly, appropriately, and effectively with people from different cultures (OECD, 2018). OECD's concept of global competence goes beyond the perspective of global competence proposed by other individuals or countries and stands in the perspective of the whole human subject, which greatly enhances the height of the theory of global competence and reflects the trend of the connotation of global competence shifting from the "logic of elements" to the "logic of action". On this basis, OECD developed it into a measurable tool and carried out the first large-scale PISA global competence assessment in the world in 2018. This marks that global competence has entered the stage of practical exploration from the theoretical stage, and global competence education has made substantial progress.

3.3 From 2018 to the present: the reflection period from critique to integration

With the attention that global competence assessments have attracted worldwide, global competence research has also ushered

in a period of critique and reflection in the academic world, which is mainly reflected in four aspects. The first is the rationalization of the results of the global competence assessment. By examining responses to the PISA global competence test from a student perspective, some scholars have argued that the results obtained from the assessment do not fully and accurately reflect students' understanding and that there are areas of failure (Chandir, 2022).

Secondly, by digging deeper into the nature of global competence theory and the context in which it was developed, it is argued that the terminology of the OECD global competence Framework is used inappropriately, and that there is overlap and confusion with other international terminology such as global citizenship and internationalization (Engel, Rutkowski, & Thompson, 2019). In addition, the terms "other culture" and "different backgrounds" are prone to exclusivity and differentiation bias, which in turn may lead to discrimination (Simpson, & Dervin, 2019). Thirdly, it is argued that the OECD global competence presents a narrow view of inclusion. For example, there is a notable lack of strong engagement with people on poverty throughout the 2018 global competence framework; there is no mention of how global competence allows young people to reflect on their own and/or society's attitudes towards people with physical, intellectual and/or emotional disabilities, nor does it take into account that the important contribution of persons with disabilities in their efforts to create an inclusive and sustainable future; it also ignores the barriers to accessing digital infrastructure that excludes the millions of people who do not have access to these "new types of learning" (Cobb & Couch, 2021). Fourth, global competence theories are seen to have implicit assumptions of "privileged status", "hegemonic orientation" and "global elitism" (Engel et al., 2019). Although there has been a period of questioning and reflection on global competence theories and assessments, it is undeniable that global competence has become an important component of core competence in the 21st century, which is in line with the bidirectional demands of individual and societal development.

Meanwhile, theoretical research on global competence has shown a trend of integrating East and West. In particular, Simpson et al.(2019) point out that some of the ideas in China's Community of Human Destiny initiative are potentially alternative and worth studying. Mansilla and Wilson (2020) have specifically proposed a cultural reinterpretation of "global competence" rooted in both Eastern and Western traditions, arguing that in the Chinese context, being globally competent means "a lifelong process of developing oneself, one's capacities and one's character to understand issues of global and cultural significance and to take action for collective well-being and sustainable development", and emphasizes the four "virtuous dispositions" that are essential for action in a more interconnected world: (a) a commitment to inquire about the world within and beyond one's environment; (b) seeking to understand the perspectives of others and to live in harmony with them; (c) consciously listening, communicating, and interacting across differences; and (d) taking ethical action to help build a more harmonious society. Global competence is seen here as the process by which an ethical person "becomes human" through daily interactions with the wider world, and lifelong self-cultivation, on the other hand, encompasses both cognitive abilities and ethical values, and is an essential quality for a citizen living in an increasingly connected world (Mansilla, Wilson, Teng, An, & Xu, 2022). By now, the development of global competence theory has gone through a process from the United Nations' Education for International Understanding to the authoritative release of the OECD's global competence to the East-West fusion initiative, with its connotations being continuously enriched towards the comprehensive cultivation of people through education.

The real sense of global competence research in China can be roughly traced back to the regional and country-specific studies centered on countries along the Belt and Road since 2013 (Jia &Lu, 2022). The earliest literature on global competence began in 2014, and after 2018, the number of studies on global competence conducted by Chinese educational institutions and scholars began to gradually increase, demonstrating the Chinalization of global competence theories. In this year, Tsinghua University set up the Guidance Center for Students' Global Competence Development, integrating "global competence" into the whole process of talent cultivation. Meanwhile Chinese Xinhangdao International Education Group set up the Research Center for Global Competence, and put forward the "Xinhangdao Global Competence Model". In May 2020, the first Global Engagement Academy was officially established in Shandong University (Weihai, China), marking that China's global competence education is moving towards an organizational process (Jia & Lu, 2022).

4 Distribution of global competence research themes

The current global competence research themes have penetrated into all aspects of the education field, and can be summarized into two aspects: global competence assessment and global competence education.

4.1 Research on global competence assessment

4.1.1 Research on students' global competence assessment

The assessment of global competence has been an important part of global competence research, with students as the main target. Scholars have carried out research on the assessment of students' global competence in multiple school segments, the most famous of which is the OECD's PISA Global Competence Assessment. The assessment consists of two parts: a cognitive test and a student questionnaire (OECD, 2018): the first part is a cognitive test focusing on "global understanding", which aims to assess students' background knowledge and cognitive skills needed to solve global and cross-cultural problems; the second part is a student questionnaire (Table 1) that collects self-reported information on students' knowledge of global issues and intercultural relations, socio-emotional skills such as intercultural communicative skill, adaptability, and perspective taking, attitudes including openness, respect for other cultures, and global mindedness, as well as information on school and teacher activities to promote global competence. Both components were analyzed through descriptive analyses of Likert scales for comparisons between countries. The results of the assessment (OECD, 2020) showed that students in Singapore performed the best overall, followed by Canada; girls are more aware of global issues, have a better understanding of others' perspectives, and are more interested in learning about other cultures, while boys are more open to change and are more adaptable. The report also shows that children's global competence levels are influenced by their parents and teachers. In other words, students' global competence levels show country, geographic and gender differences, and even family and teachers are important influences.

Table 1 Questionnaire Items of PISA Global Competence Assessment（OECD，2018：196-197）

Dimension	Items
Knowledge	knowledge of global issues
	knowledge of intercultural issues
Social skills	ability to communicate in multicultural contexts
	adaptability
	perspective taking and empathy
Attitudes	openness toward people from other cultural backgrounds
	respect for people from other cultural backgrounds
	global mindedness

In addition to targeting adolescent students, there is also a relatively large body of literature that has conducted research on assessing the global competence or intercultural competence of college students. For example, Hunter & B.(2006) proposed a three-dimensional global competence framework including knowledge and understanding, skills, and attitudes and values, and also developed an assessment tool to evaluate college graduates. More scholars have adopted a four-dimensional assessment framework to assess the global competence level of college students. For example, some scholars have used the Fuzzy Comprehensive Evaluation (FCE) method to construct an FCE indicator system and model for Chinese college students' ICC which includes four dimensions of knowledge, attitude, skills and awareness, providing cross-cultural scholars with a new non-Western perspective for their research and assessment in non-Western contexts (Peng, Wu, & Fan, 2015). In addition, different studies have expanded according to the purpose of the assessment, such as adding the examination of college students' international experience (Liu & Hung, 2018) and action orientation (Zhou, Yao, & Huang, 2020). The findings of these studies also conveyed the current situation of college students' global competence level, i.e., U.S. students performed slightly lower than Chinese students in terms of overall global competence performance, and Chinese students significantly outperformed U.S. students in the knowledge and attitude dimensions (Li, 2013);Chinese college students showed high levels of attitudes and values (Peng et al., 2015; Tang, Peng, & Li, 2021; Zhou et al., 2020), but a generally low level of knowledge and skills (Tang et al., 2021; Zhou et al., 2020), especially in intercultural communication and cognitive skills (Peng et al., 2015).

On the other hand, Liu, Yin, & Wu (2020) made the global competence assessment for the graduate student, which focuses on their knowledge and understanding, skills and attitudes of global competence and the international academic knowledge and communication ability. The survey shows that Chinese graduate students have open attitudes and world knowledge, but lack the ability to communicate cross-culturally. Especially in international academic exchanges, Chinese graduate students generally lack the confidence and skills to communicate with international scholars and colleagues, although they have sufficient knowledge and intention to communicate.

From the current research, students' global competence is still mainly measured by self-reported questionnaires. Except for the PISA global competence assessment, which targets 15-year-olds, most of the current studies target undergraduates, with a small number of high school and graduate students, and

no assessment studies have been found on the vocational college students. With the popularization of global competence education, a large amount of data on students' global competence in different countries, regions, and school years have yet to be mined and presented to inform global competence education reform.

4.1.2 Research on teachers' global competence assessment

Global competence is an important characteristic that teachers need to have in a globalized world. In order to ensure the effectiveness of talent cultivation, it is most important to first improve the level of global competence and teaching ability of teachers, so whether teachers have global competence and teachers' global teaching competencies are the main assessment content. The empirical research on teachers' global competence assessment are not too much . The pioneers in the assessment of teachers' global competence level are Li Olsen and Kroger (2001), who designed a survey scale from the three dimensions of global competence: substantive knowledge, perceptual understanding, and intercultural communication skills, of which substantive knowledge includes knowledge of cultures, languages, world issues, global dynamics, and human choices; perceptual understanding, as a kind of positive global competence, includes open mindedness, resistance to stereotype, complexity of thinking, and perspective consciousness; and intercultural communication, which refers to the skills used to communicate effectively with others, including adaptability, empathy, cross-cultural awareness, intercultural relations, and cultural mediation. The results showed that the faculty and staff in New Jersey City University had overall high levels of the substantive knowledge and perceptual understanding of global competence, and were slightly deficient in the cross-cultural communication, as evidenced by the fact that few of them worked professionally with people from other countries.

The assessment of Chinese teachers' global competence is mainly concentrated in dissertations, focusing on primary and secondary school teachers. For example, Liu (2015) conducted relevant surveys and analyses with global issues, global culture and global connectivity as thematic dimensions, and knowledge, competence, values and action as target dimensions on teachers of a elementary school in Shanghai, China; Zhang (2019) conducted a survey on junior and senior high school teachers in the Pearl River Delta region of Guangdong Province based on the PISA global competence framework. Both of these studies found that the overall level of teachers' global competence in Chinese primary and secondary school is good, and also found that the level of teachers' global competence has a strong correlation with the subjects they teach and their academic qualifications.

The level of teacher's global competence is not the same as global competence teaching. Teachers' global competence teaching are defined as "the ability to consciously perceive the impact of global processes on the academic process, to understand the impact of multinational and multicultural environments, and to engage in successful teaching and learning in any global environment (Orazbayeva, Khalitova, Atemkulova, Sultanova, & Abdrakhmanov, 2018)." There are currently three important tools for measuring teachers' global competence teaching. The first one is the Globally Competency Learning Continuum (GCLC), an online self-reflection tool developed by the American Association for Supervision and Curriculum Development (ASCD) for teachers (Table 2). The tool identifies 12 most important characteristics in three dimensions, including global competence disposition, knowledge, and skills, and is categorized into five hierarchical levels: Nascent, Beginning, Progressing, Proficient, and Advanced. The instrument has been proven to be an effective tool for teachers in international schools and is the only one designed specifically for teachers by an authoritative educational organization (Carter, 2020).

Table 2 Globally Competency Learning Continuum Indicators (Carter. ,2020)

Indicator	Sub-indicator	Nascent	Beginning	Progressing	Proficient	Advanced
Dispositions	1.empathy and valuing multiple perspectives					
	2.a commitment to promoting equity worldwide					
Knowledge	3.an understanding of the ways that the world is interconnected					
	4.an understanding of global world conditions and current events					
	5.experiential understanding of multiple cultures					
	6.intercultural communication					
Skills	7.intercultural communication					
	8.create a classroom environment that values diversity and global engagement					
	9.design learning experiences for students that promote content-aligned investigations of the world					
	10.develop local, national, or international partnerships that provide real world contexts for global learning opportunities					
	11.facilitate intercultural and international conversations					
	12.develop and employ appropriate methods of inquiry to assess students' global competence development					

The second is Global Competence Rubrics designed by Parmigiani et al.(2022) for pre-service teachers to conduct a self-assessment of teachers' ability to be Global Competent within the conceptual framework of OECD global competence. The scale consists of three areas, each of which indicates the level of engagement with global competence activities (Table 3): The first area is "exploring", which consists of 6 indicators in four dimensions (openness, intent to experience/interact, global responsibility and ethical orientation); The second area is "engaging" which includes 7 indicators in five dimensions (global self-awareness, worldviews, perspectives and cultural diversity, inclusion and diversity, global challenges and conditions, and sustainability); The third area is "acting" including 19 indicators in seven dimensions (self-reflection, professional interaction/collaboration and multilingualism, managing complex learning environments, intercultural teaching, international practice, active teaching strategies, and interactive assessment strategies). Each indicator in the three global competence areas is required to be reported on a 4-point scale (emerging, developing, achieving, extending), with the addition of a fifth option, "not applicable" which means that this criterion is not applicable to me. Based on this scale, Sokal and Parmigiani (2022) assessed Canadian teacher candidates' ability to be global competent and found that students develop greater global competence as a result of specific experiences during teacher education programs, not just due to greater life experience. Moreover, research has demonstrated that innovative approaches in teacher education can play a similar role to international internships, and that they provide more opportunities for equitable experiences than costly international internships.

Table 3 Global Competence Rubrics（Sokal and Parmigiani，2022)

Dimensions	Indicators/Criteria	emerging	developing	achieving	extending	not applicable
Area A. Exploring	A1 openness					
	A2 intent to experience/interact					
	A3 global responsibility					
	A4 ethical orientation					
Area B. Engaging	B1 global self-awareness					
	B2 world views, perspectives and cultural diversity					
	B3 inclusion and diversity					
	B4 global challenges and conditions					
	B5 sustainability					
Area C. Acting	C1 self-reflection					
	C2 professional interaction/ cooperation and multilingualism					
	C3 managing complex learning environments					
	C4 intercultural teaching					
	C5 international practice					
	C6 active teaching strategies					
	C7 interactive assessment strategies					

Given that the majority of research has addressed the measurement of teachers' global competence levels and teaching competencies, Kerkhoff (2017) developed the Teaching for Global Readiness(TGR),a self-report instrument for measuring teacher practices related to constructing global teaching and learning through an exploratory mixed research design. The scale was constructed with four primary dimensions of situated practice, integrated global learning, critical literacy, and transactional experience and 19 items. Based on this foundation, Kerkhoff and Cloud (2020) further adapted it to form the new Teaching for Global Readiness Scales (TGRS) (Table 4), which consists of four primary dimensions (contextual, integrative, critical, and transactional) and 21 items, all of which were assessed with a five-level Likert scale. Teachers can use the data collected from the TGRS scales to self-assess and set professional development goals. Schools can also use it as a measure of program effectiveness before and after training.

Table 4 Teaching for Global Readiness Scale (Kerkhoff & Cloud, 2020)

Subscale		Question		Degree			
		In the last two weeks, how often have you:	Never	Once in two weeks	Once a week	2–3 times a week	Daily
Critical	1	Reflected on your own assumptions and biases.					
Critical	2	Used texts written by authors from diverse countries.					
Situated	3	Guided students to examine their cultural identity.					
Integrated	4	Integrated global learning with the existing curriculum.					
Integrated	5	Assessed students' global learning.					
Situated	6	Provided a space that allows learners to take risks.					
Situated	7	Provided a space that allows students a voice.					
Situated	8	Attempted to break down students' stereotypes.					
		In the last two weeks, how often have you asked students to:	Never	Once in two weeks	Once a week	2–3 times a	Daily

			Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
		week					
Critical	9	Engage in discussions about international current events.					
Critical	10	Analyze the reliability of a source.					
Critical	11	Analyze the agenda behind media messages.					
Critical	12	Construct claims based on primary sources.					
Integrated	13	Use inquiry-based lessons about the world (e.g., research projects, exploratory learning, discovery learning).					
Transactional	14	Utilize technology (e.g., Skype, email) for virtual interviews (with experts, community members, etc.).					
Transactional	15	Utilize asynchronous technology (e.g., email, blogs) for international collaboration.					
Transactional	16	Utilize synchronous technology (e.g., Skype, Google Hangout, FaceTime) for international collaboration.					
During a typical semester, I:			Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Integrated	17	Build a repertoire of resources related to global education.					
Situated	18	I take inventory of the cultures represented by my students.					
Situated	19	I cultivate a classroom environment that values diversity.					
Situated	20	I cultivate a classroom environment that promotes equality.					
Transactional	21	I bring in speakers from different backgrounds so that students can listen to different perspectives.					

Measuring global competence is a complex task that requires different perspectives and methods. At present, the research mainly focuses on the level of teachers' global competence, teaching competencies and readiness to teach, and the measurement dimensions are mainly centered on the knowledge, skills, attitudes and values of global competence, as well as teaching methods and strategies. The assessment method was also based on self-report questionnaires supplemented by qualitative research such as open-ended questions and semi-structured interviews to examine the participants' cognitive attitudes as well as their specific teaching strategies and methods in teaching practice. The study covered both pre-service and in-service teachers, with a focus on primary and secondary school teachers and university teachers.

4.1.3 The representation of global competence in teaching materials

As an important carrier of knowledge, whether or not teaching materials carry the knowledge, abilities and values of global competence and the way they are represented will affect the global competence level of students and teachers, and is also an important factor in the development and implementation of global competence education. The research on the representation of global competence in textbooks has just begun, and the results in this area are not abundant, mainly following two paths: One is to take the four major themes in the PISA global competence assessment as the analytical framework, including culture and intercultural relations, socio-economic development and interdependence, environmental sustainability and systems, conflict and human rights. Pei-Yi Chou (2016) conducted a series of studies on Taiwan's elementary school textbooks based on this framework, and found that about 10% of Taiwan's 84 elementary school textbooks of various subjects had content related to the global dimensions, with a general emphasis on environmental sustainability and world peace, and a lack of material on human rights and social justice; most of the global competence themes appeared in the curricula of social studies and integrative activities, and to a lesser extent, in elementary school mathematics and English textbooks. Using the same analytical framework and methodology, a content analysis of Taiwan's junior high school English textbooks was conducted. It was found that about 40% of the content related to global competence in English textbooks in junior high schools is mainly distributed in the area of "culture and intercultural relations", and there is not much presentation of topics such as "socio-economic development and interdependence", "environmental sustainability", and "elimination of conflicts, preservation of the system, and human rights", most of which are not the main learning issues (Pei-I, Ya-Ting, & Shu-Ting, 2019). The above studies show that The textbooks of Taiwan have begun to emphasize the importance of global competence, but the ideal of linking to all aspects of education and all curricular areas remains a challenge. Similarly, Cheng (2021)

and Liu (2022) analyzed Chinese English textbooks of high school and junior high school with the four major themes (Table 5), and found that Chinese English textbooks basically covered the content of global competence, with the area of "culture and intercultural relations" the most, and the other three themes relatively little or no.

Secondly, the analysis of teaching materials is carried out along the thematic areas of international understanding education as the analytical framework. For example, Xiao (2021) revised the existing theoretical framework of global competence in a localized way, and formed a list of theme dimensions including global issues, global culture, and global connections, and a list of goal dimensions including "knowledge", "skills", "attitudes/values". 70 education policy texts about Chinese primary and secondary schools, and 41 curriculum standards for various subjects at the compulsory and upper secondary levels of education were analyzed. This is a further localized development of global competence theory in the field of teaching materials analysis, and an exploratory study of teaching materials from the macro- and meso-levels. The results further illustrate that the objectives of Chinese primary and secondary school curricula combine both local and global content, emphasizing both the response to local traditions and demands and the global awareness of facing the world and building a community of human destiny. The three-dimensional objectives of knowledge, skills and qualities, as well as the core literacy of disciplines, are used to build curriculum that point to global competence. In the above analysis of the representation of global competence in the textbooks, there is a certain degree of similarity in the thematic content, all of which mainly examines the knowledge and understanding dimensions of global competence, and has not yet touched on the presentation of global competence content in the textbooks.

Table 5 Content Analysis Framework of Global competence in Teaching Materials (Cheng，2021)

Dimension	Sub-dimension	Specific content
Culture and intercultural relations	Identity formation in multicultural societies	Focus on how young people can develop their cultural identity in a multicultural community and a connected society
	Cultural expressions and cultural exchanges	Focus on the topic of preserving the world's cultural capital (e.g. languages, arts, traditions) and the relationship between dominant and non-dominant cultures
	Intercultural communication	Focus on understanding the complexity of communication processes involving people from different cultural backgrounds
	Perspective taking, stereotypes, discrimination, and intolerance	Ability to understand and think differently about society/culture, as well as the nature, manifestations, effects, and means of responding to cultural biases
Socio-economic development and interdependence	Economic interactions and interdependence	Focus on the linkages and interdependence of multidimensional economic systems
	Human capital, development, and inequality	Focus on the relationship between economic integration and social development
Environmental sustainability	Natural resources and environmental risks	Understand the major environmental risks facing the planet and the ecological interdependence of nature
	Policies, practices, and behaviors for environmental sustainability	Focus on what decision makers and individuals can do to reduce resource consumption and better manage environmental risks
institutions, conflicts, and human rights	Prevention of conflicts and hate crimes	Refer to the institutions and strategies involved in controlling, defusing and preventing violent conflict
	Universal human rights and local traditions	Human rights education, the scenario involves important documents such as the Universal Declaration of Human Rights or the United Nations Convention on the Rights of the Child
	Political participation and global engagement	Opportunities for young people around the world to have a voice and make a difference in a local or global context

4.2 Research on global competence education

In the last decade, international organizations and developed countries have paid increasing attention to global competence, explored global competence education by expanding international education concepts, adjusting talent cultivation goals, designing and developing curricula, etc., and extensively explored how to cultivate and develop students' global competence, and the main paths are reflected in the following:

4.2.1 Develop project-based global competence teaching

The traditional approach to developing intercultural competence is study abroad. Numerous studies have shown that study abroad programs are conducive to the growth of students' global knowledge and intercultural competence (Kang et al., 2017) and various countries have helped students develop global competence by conducting short-term programs such as summer programs (Mcconnell & Koehler, 2011), study abroad experiences (Alexandre et al., 2016), international field studies (Thomas, Safai, & Thompson, 2013), and international cooperation programs between schools respectively. However, further research by scholars has found that simply sending individuals overseas does not ensure the development of multicultural attitudes and cognitive mindsets, no matter how well prepared and supported the institution is (Alexandre et al., 2016).

4.2.2 Develop curriculum-based global competence teaching practices

Curriculum-based teaching is a universal method of implementing global competence education, which can be realized in two ways, namely, separate courses and curriculum integration. For example, some scholars provide a public interest action course based on social entrepreneurship and digital skills for students in community colleges in the U.S (Yu, & Duchin, 2022). The courses provide relevant content for students with different cultures and backgrounds, personal values, and senses of identity, so that students are able to understand the global and local situations in different geographic regions, as well as access and share information through the Internet, and develop possible solutions and make them a reality. Heng, Yeh, Heng, and Yeh (2022) used English video production courses to develop students' local cultural knowledge and global competence so that students not only gain a stronger foothold in cultural identity, English and digital literacy skills, but also become more proactive and recognize the importance of teamwork and collaboration.

4.2.3 Integrated global competence teaching with information technology

Information literacy is an important element of global competence. Teaching that integrates information technology and global competence is a requirement of global competence itself and a trend of teaching in the new era. The cross-cultural program of media creation called KomaKids, which was carried out in schools in Japan, Thailand, and Brazil in 2017, is a game that uses stop-motion animation and digital media as the main tools to provide elementary school students with the provide opportunities to learn about the world outside the classroom and to recognize and learn about the diversity of the world (Topoklang et al., 2018). In addition, the integration of information technology and global competence has enabled the local internationalization of global competence development, which is increasingly becoming the main way of internationalizing global competence development, especially in times of world outbreaks. It has been demonstrated that intentionally designed cross-cultural online programs can significantly enhance college students' intercultural competence and understanding of the target country (Kang et al., 2017). It has even been indicated that, based on self-reports from undergraduate students at U.S. universities, participating in internationalization-related activities at home may yield greater perceived benefits to students' global, international, and intercultural literacy (GII) development than studying abroad (Soria, & Troisi, 2014). This suggests that students' global competence can be improved and enhanced on campus through in local internationalization approaches, and that information technology opens the door to the development of global competence for students who are unable to take advantage of study abroad programs, as well as providing a pathway for the universalization of global competence education.

4.2.4 Take textbooks as global competence teaching vehicle

Some studies have indicated that students' intercultural awareness can be realized through intercultural dialogues between texts and readers. In view of the uneven state of intercultural competence shown in Chinese English textbooks, Yu & Van Maele (2018) conducted a semester-long action research on teaching an English reading course based on Baker's model of intercultural awareness. In this study, the authors first identified intercultural awareness development as the learning goal of the course, and then combined intercultural awareness (ICA) development with English reading by asking and guiding students to complete five sessions of scanning and selecting, comprehending and summarizing, analyzing and comparing, reflecting and evaluating, and empathizing and respecting texts under the same theme. Although the study did not take the textbook as a direct object of study, it is not difficult to find that the selection and excavation of the text plays an important role in the cultivation of students' intercultural awareness, and that students' intercultural knowledge, multi-faceted viewpoints and perspectives as well as open and tolerant mentality can be cultivated through the dialogues between the readers and the text. Such micro-studies are still rare.

As mentioned above, rich explorations of global competence education and teaching practices have been carried out. The research involves a variety of pathways such as projects, curricula, information technology and teaching materials, reflecting the interoperability of theory and practice, and the combination of internationalization and local internationalization. There is still a point to mention that the current research on global competence teaching and learning still favors the macro and meso levels, with programs and curricula being the main teaching pathways. At the micro level, research on the role and value of teaching materials and other resources in global competence teaching is still rare. It is worth noting that, like ordinary teaching and learning activities, global competence teaching and learning is a comprehensive practical activity with the participation of multiple subjects, and in addition to teachers and students, teaching materials are also an element that should not be neglected in the research on global competence education.

5. Research Review and Prospects

5.1 Review of existing research

The current research on global competence mainly focuses on the exploration of global competence theory, global competence assessment and global competence education, presenting the following characteristics:

5.1.1 The country scope is gradually expanding

Although the countries carrying out global competence research are still mainly dominated by the U.S. and U.K., they have gradually expanded to non-English-speaking countries,

such as China, South Korea, Japan, Thailand, Brazil and so on. The gradual expansion of the country scope shows that human beings have made efforts to dissolve the gap between each other and commit themselves to solving the global problems faced by human beings in common.

5.1.2 The research object covers a wide range

The objects of global competence research not only includes young students, college students and postgraduates, as well as teachers and other teaching subjects, but also covers teaching materials, curriculum standards, educational policies, etc., indicating that the concept of global competence has gradually attracted the attention of scholars, and is increasingly penetrating into the various aspects of the field of education, and that the breadth and depth of the research are being gradually expanded.

5.1.3 The characteristic of research methodology is obvious

The current global competence assessment of teachers and students still mainly adopts self-reported questionnaires, with a small amount of combination of knowledge tests and interviews. The content analysis of global competence in teaching materials also mainly uses the content analysis method, which is based on certain theoretical frameworks to qualitatively analyze different teaching materials and present them in a quantitative way. Therefore, the research method of global competence is characterized by the paradigm of quantitative research supplemented by qualitative research.

5.2 Implications and prospects

5.2.1 There is a need to strengthen localized exploration and break through the western-centered logic

In the process of theorizing and practicing global competence, there is bound to be a process of localization, which means that in the future, it is necessary to explore the global and cross-cultural logic beyond the English-speaking countries, Western-centered and/or Euro-centered (Simpson et al., 2019). At present, the "four-dimensional" structure of global competence is widely recognized by academics, and the specific content of the four dimensions has been continuously improved and enriched, while presenting a fusion of Chinese and Western perspectives (Mansilla & Wilson, 2020). In particular, scholars have pointed out that some of the ideas in China's Community of Human Destiny Initiative are worth studying (Simpson et al., 2019). As the OECD and other influential organizations continue to refine their understanding of global competence, there is a need to seek a broader range of voices in the future to inform policy direction (Ledger, Thier, Bailey, & Pitts, 2019), as well as a need to further examine the inclusiveness of existing global competence frameworks from a localized global competence perspective (Stein, 2015).

5.2.2 It is required to expand the scope of the study and moving from the local to the global

According to the results of the current assessment of global competence, the global competence levels of teachers and students show differences in terms of country, region, school section and gender. The scope of the study is still relatively limited, for example, the assessment of students' global competence mainly involves students in middle schools and colleges, but there is a lack of assessment of the global competence level of students in vocational institutions. Although the assessment of teachers' global competence covers both pre-service and in-service teachers,

it still focuses on teachers in primary and secondary school and university, and the situation of teachers' global competence levels and teaching competencies in vocational education is not yet clear. In addition, from a geographical point of view, the assessment of Chinese teachers' global competence is mainly concentrated in the developed regions of North, Shanghai and Guangzhou, and the findings of the existing study cannot reflect the whole picture of Chinese teachers' global competence. Future research should further expand the scope of the study population and examine the global competence level of teachers and students in different regions, different school years, and different genders.

5.2.3 Classroom teaching needs to be deepened to put global competence theory into practice

For example, the exploration of global competence education still favors the macro path, with programs and courses being the main teaching paths, and there is a lack of research on the implementation of specific teaching strategies. Meanwhile, at the micro level, research on the role of teaching materials in global competence education is still rare. The analysis of global competence-oriented teaching materials is still dominated by static analysis, and there are few studies on teachers' global competence teaching strategies and how to use textbooks to develop global competence for students, suggesting that future classroom research on the relationship between teachers, global competence and materials should be conducted (Xu, 2013).

5.2.4 Foreign language proficiency needs to be emphasized among the multiple goals

Although the dimensions of global competence defined by different scholars are different, there are some commonalities, including specific knowledge, abilities, attitudes, and values and behavioral orientations needed to develop in a globalized world, among which foreign language-based communication skills are essential to the global competence in all periods. Foreign language thinking is a stereoscopic thinking similar to global thinking (Reimers, 2009), especially for non-English speakers, and learning a second language is one of the most effective ways to allow students to see things from multiple perspectives and possibly consider the existence of worldviews different from their own (Mansilla & Jackson, 2012). Moreover, some studies have found a positive correlation between global competence and second language motivation, as well as between global competence and the components that make up the motivation to learn a second language, meaning that the greater the motivation of students to learn a second language, the greater the likelihood that students will perceive themselves as globally competent, and vice versa. In addition, the OECD has published the PISA 2025 Framework for the Assessment of Foreign Languages, which defines foreign language competence as the ability to communicate effectively in a foreign language, including a combination of communicative language skills and general competence (OECD, 2021). The basis for the development of the framework and the orientation of the assessment will, to a certain extent, will also provide a guideline for the development of global competence teaching in countries where English is a second foreign language, which will help reflect on the existing English teaching from an international perspective and optimize the reform of English teaching in accordance with the specific conditions of the country.

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