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Research competencies in teacher training in the early childhood education career

Competencias investigativas en la Formación del Docente de la Carrera de Educación Inicial

Competências investigativas na formação de professores para a carreira

Abstract

Research skills are fundamental in the training of teachers as a transversal axis of their work. The objective of this research is to analyze the development process of these skills through classroom activities. This study is framed within the phenomenological interpretive paradigm and employs a mixed-methods approach. The scope of the research is explanatory, utilizing a non-experimental, cross-sectional, bibliographic, and field design. The population consisted of 92 students who completed a questionnaire, and 17 teachers who participated in structured interviews, totaling 109 subjects. The response of the students regarding the identification of a problem was predominantly negative, with 70% indicating they could not identify a problem. Similarly, 81% of students reported a lack of statistical knowledge. Additionally, 94% of students did not use specialized databases for research. Teachers in training emphasized the need for a multidisciplinary approach to develop and strengthen these competencies. The authors support the idea that a harmoniously structured system of activities, aligned with the cognitive needs of teachers in training, will lead to the consolidation of these competencies among the early childhood education students at Salesiana Polytechnic University in the city of Guayaquil.

Keywords: competencies, research, teacher training, initial education, multidisciplinary, multidisciplinary

Resumen

Las competencias investigativas son fundamentales en la formación del docente investigador como eje transversal de su quehacer laboral. El objetivo de esta investigación consiste en analizar el proceso de desarrollo de estas competencias, a través del proceso áulico. Este estudio se enmarca en el paradigma interpretativo fenomenológico, con un enfoque mixto, el alcance de la investigación es explicativa, con un diseño no experimental, de corte transversal, bibliográfica y de campo. La población estuvo compuesta por 92 estudiantes a los cuales se les aplicó un cuestionario, mientras que la entrevista estructurada se destinó a 17 docentes, para un total de 109 sujetos. La respuesta de los estudiantes en cuanto a la identificación de un problema fue mayoritaria con 70% un no, al igual que los conocimientos estadísticos, la respuesta fue no con 81%. El uso de base de datos especializadas para la investigación obtuvo una negativa con un 94%. Los docentes en formación consideran la necesidad de la multidisciplinariedad para el desarrollo y fortalecimiento de esas competencias. Los autores sostienen la idea de que un sistema de actividades armónicamente estructurado acorde con las necesidades cognitivas de los docentes en formación, conllevará a la consolidación de las mencionadas competencias en los estudiantes de educación inicial de la Universidad Politécnica Salesiana de la ciudad de Guayaquil.

Palabras clave: competencias, investigativas, formación docente, educación inicial, multidisciplinariedad

Resumo

As competências de investigação são fundamentais na formação de professores investigadores como eixo transversal do seu trabalho. O objetivo desta pesquisa é analisar o processo de desenvolvimento dessas competências, por meio do processo presencial. Este estudo enquadra-se no paradigma interpretativo fenomenológico, de abordagem mista, o âmbito da investigação é explicativo, com desenho não experimental, transversal, bibliográfico e de campo. A população foi constituída por 92 alunos aos quais foi aplicado um questionário, enquanto a entrevista estruturada foi dirigida a 17 professores, num total de 109 sujeitos. A resposta dos alunos quanto à identificação de um problema foi maioritária com 70% um não, tal como o conhecimento estatístico, a resposta foi não com 81%. A utilização de bases de dados especializadas para pesquisa foi 94% negativa. Os professores em formação consideram a necessidade da multidisciplinaridade para desenvolver e fortalecer essas competências. Os autores defendem a ideia de que um sistema de atividades estruturado harmoniosamente de acordo com as necessidades cognitivas dos professores em formação levará à consolidação das competências acima mencionadas nos alunos da educação inicial da Universidade Politécnica Salesiana da cidade de Guayaquil.

Palavras-chave: competências, pesquisa, formação de professores, educação inicial, multidisciplinaridade, multidisciplinaridade

Backgrounds

One of the fundamental aspects in Higher Education Institutions is the constant improvement in the educational work of their students, with the aim of guaranteeing proactive, innovative, and high-quality professionals. Being a teacher demands ongoing preparation, in addition to the necessary competencies for engaging with students.

The core processes of Higher Education Institutions (HEIs)—teaching, research, and community engagement—must be integral to the university student's experience. The training of early childhood education students not only focuses on the pedagogical area but also on their roles as teacher-researchers, allowing them to address the changes and needs of human beings and find potential solutions to educational problems. As stated by Banderas et al. (2018):

The formation of research competencies at the undergraduate level has increased due to the need for professional training in knowledge generation and its connection with societal demands. The development of research has strengthened the university structures to fulfill this essential function of the university. This is because the university cannot be understood without research, which is a key function of the faculty as an academic sector and of students as professionals in training. (p. 3)

Both UNESCO (2016) and the Organization for Economic Cooperation and Development (OECD, 2018) advocate for the qualification of teachers by the year 2030, which is understood to be the result of ongoing public policies. In other words, teacher training should consider competencies that ensure quality for students in their learning, the acquisition of skills and abilities for optimal job performance.

On the other hand, research competencies are seen as part of the graduate profile in various fields, as well as a cross-cutting axis throughout the years of university learning with an impact on a research culture. The need to develop research competencies within educational spaces is essential for professional performance in any field.

According to Moscoso and Carpio (2022):

The researching teacher, in addition to fulfilling the functions and tasks determined by laws, regulations, and rules, has the fundamental function of developing as a person, citizen, and professional through the acquisition of the necessary competencies to investigate, understand, interpret, and comprehend the complexity of their own reality, their region, their country, and the world. Therefore, the teacher, in their dual mission of educating and researching, possesses all the necessary tools to effectively intervene and engage in a reflective, responsible, and critical manner in the process of transforming historical and social reality. (p. 186)

The foregoing highlights the urgency of a curricular transformation, adopting competency-based models as a cross-cutting axis, as exposed by the Alfa Tuning Latin America Project since 2007, with the challenge for HEIs being the generation of strategies to operationalize the curriculum within the classrooms (Cupare, 2023). The evolution of education goes hand in hand with the use of ICTs, which for Suárez-Triana et al. (2020), suggests the use of web 3.0 tools for the development of the competency of interpretation and problem-solving in research projects.

The training of early childhood education students includes didactic and pedagogical aspects as well as the development of research competencies that allow them to be part of a dynamic process of changes regarding the quality of education offered in the higher education system.

The starting point for the development of research competencies does not begin at the moment of conducting "research," but rather during the entire undergraduate academic process, within the classroom spaces of each subject. In the specific case of early childhood education teachers, their professional profile is demanding, as the beneficiaries of this training are children aged 3 to 6 years old, in the Early Childhood Education program at Salesiana Polytechnic University, which implies a greater emphasis on research development. This is expressed by Mármol et al. (2022):

With this demand, it is necessary for Higher Education Institutions (HEIs) to provide their students with the appropriate tools for their training. This entails great complexity and a challenge for institutions, as well as the integral and harmonious development of the professional. This challenge is accompanied

by research skills in the interdisciplinary nature of each science, as a cross-cutting axis, but with the specificities of each area of knowledge. (p. 143)

Professionals in the field of education are not only dedicated to teaching, but also to educational research in the face of the diversity of problems that arise from this variable; the important thing is that their training includes aspects that tend to the resolution of educational problems, the development of educational, didactic, and pedagogical projects. Espinoza et al. (2013) concludes the need to promote processes of training for research teachers based on competencies, to structure research collectives and the development of theoretical constructs that contribute to a real transformation of education with quality from a practical perspective.

Accompanying early childhood education students during their training is essential for them to assume a leading role in their learning, allowing them to progress at their own pace and apply acquired knowledge effectively, providing responses to situations that arise in their context (Hernández et al., 2021).

Salesiana Polytechnic University, in its role as a professional training institution, assumes the commitment to the demands of society, in this case, early childhood education students, who upon graduation must meet the profile of the necessary competencies, such as: investigative, socio-emotional, cognitive, and labor competencies, which are demanding in the professional environment. (Moncayo, Boza, and Manjarrez, 2021).

The demands and requirements of the global context impact the need for professionals who respond to substantive changes in the educational system from its foundations: early childhood education. The selection of professionals nowadays is directed towards a competency-based management framework for the applicant, according to the requirement requested by the organization.

Competencies, as referred to by Vargas-Zuñiga (2004), are human capabilities in different areas (cognitive, socio-affective, attitudinal), which allow individuals to perform successfully in the workplace. Navia (2023), on the other hand, emphasizes the importance of academic and integral competency-based education, especially in the researching teacher who supports areas of knowledge.

For the authors Ramos et al. (2018), competencies enable the operation of human capital management and in university settings, benefit the triangulation between management, work, and education. These competencies are understood as processes of constant change based on the needs of the job, organizational culture, and the work and professional life of the individual (Lora et al., 2020)."

Internalizing the importance of developing competencies in the various academic spaces of undergraduate studies, and with it, also, the training of early childhood education teachers will improve the quality of the professional, assuming research as a fundamental part of their work.

Regarding research competencies, authors such as Rubio et al. (2018) define them as specific competencies inherent to the scientific method; Rojas and Aguirre (2015) conceptualize them with the aim of developing critical, creative, and systemic thinking. All of this, together, goes hand in hand with the skills, strategies, and ethics of the researching teacher, who problematizes the observed environment, investigates it, and reflects based on that reality in order to improve it (Mendioroz and Lozoya, 2015; Avalos and Sevillano, 2018; Ayala-Ruiz et al., 2019; Martínez and Márquez, 2014).

From this perspective, it is necessary to start with the teaching staff, who must possess a series of skills, abilities, competencies, and knowledge necessary for student training. A teacher who does not engage in research is obligated to repetitively reiterate theories that are often obsolete, even resorting to repetitive and banking education.

The process of accompanying teacher-researchers with students must be enriched in a practical and continuous manner for knowledge management, its applications, scope, risks, and uncertainties adequately, fostering the acquisition of new skills for the student researcher. This is a challenge that must be assumed with responsibility and commitment. (Estrada-Cherres, et al., 2022)

Research itself allows the teacher to question, reflect, contribute, and be part of the necessary changes in education and society in general. Therefore, a learning environment is created that is nourished by research conducted continuously by those who make up HEIs. In line with the above, D'Olivares et al. (2019)

states: "Then, research competencies are determined by the being, being and acting, living and coexisting of the subject in relation to himself, with other subjects in the world and with the world itself" (P. 9). Girón (2021), on the other hand, views research competencies from the complexity of problem-solving.

If the intention is to influence the development of research competencies considering the definition that arises within the authors who handle complexity, one must think about mastering the different types of knowledge implied in this conception: knowing how to be, knowing how to do, knowing how to know, and knowing how to coexist for the sake of problem-solving. (p.164)

The need for research competencies as part of the teaching profile is clear, which implies a challenge for both the teacher and the student in training, and at the same time determining which competencies are most suitable (Moscoso and Carpio, 2022). These competencies are related to the specific job competencies for their performance, expressed in a dichotomy by the subject in training in preparing for their personal career life projects and responding to the demanding society of the moment.

Regarding the link between teaching and research, there are positions such as that of Gimeno Sacristán and Pérez Gómez (1994) who emphasize that from the process of analysis that the teacher conducts of the educational exercise, reflection and research possibilities emerge according to what is observed. In reference to this, Munguía-Reyes and Garduño-Mendoza (2022) note that the teacher who conducts research can bring the results of the research to light and thereby improve the academic level of the students, as well as develop these competencies.

Regarding the work environment, the early childhood education teacher can work as an advisor, consultant, mentor in the pedagogical area, in the production and elaboration of didactic resources, among others, as stated in the graduate profile of the Early Childhood Education program at Salesiana Polytechnic University. But also in the development of logical, systemic, creative thinking based on investigative competencies. "This is the result of the fact that research competencies are fundamental to building a basic scientific culture. Stimulating them from early childhood contributes to developing the ability to develop explanations based on inquiry and theoretical construction" (Mendioroz, et al., page 1, 2022).

It is important to agree on what the research competencies are according to the theoretical positions of the various authors who address the topic, and what an early childhood education researching teacher should develop, as seen in Table 1.

Tabla 1. Research Competencies

Authors	Research Competencies
Meldiviezo (2006)	<i>Skill to identify both educational and social problems, development of creative, critical, reflective, systemic, and analytical thinking.</i>
Castillo (2008)	Observe, inquire, experiment, analyze, interpret, summarize, write, be critical, engage in collaborative work, and empower ethical and moral values.
Tobón (2008)	It highlights activities inherent to the research method aimed at problem-solving: planning, executing, and evaluating research projects to address relevant contextual issues. Competencies related to communication, organization, and collaboration are emphasized.
Avendaño (2017)	Theoretical knowledge of the discipline and the scientific method, information organization, critical attitude, ethical behavior.
Buendía-Arias, et al., (2018)	Competencies for questioning, observational, reflective, propositional, technological, interpersonal, cognitive, procedural, analytical, and communicative competencies. The importance of educational research in teaching, competencies for narration. Defining aspects of the educational environment, generating competencies for scientific writing.
Bracho, (2019)	Oral and written competencies. Discursive competence, Analytical competence, academic writing with organization, coherence, clarity, precision. Interpretive competence.
Cardoso et al. (2019)	Identify issues within their professional context, formulate research objectives or questions, formulate the problem statement, and construct the theoretical framework. Mastery of research typology and statistical knowledge. Generate interpretation of results and their dissemination.

Continued on next page...

Authors	Research Competencies
Shiroma-Tamashiro (2019)	Information retrieval, technological proficiency, methodological mastery, proficiency in written and oral communication, and ability to work in a research team.
Sumarni, et al. (2021)	Content knowledge, methodological skills, and abilities to focus on research outcomes, skills to review research environments, communication skills, behavioral skills, affective skills, motivation, ethical issues, and information technologies.
Márquez, et al. (2020)	Teamwork, oral and written communication, leadership, working with bibliographic sources, mastery of information and communication technologies, ethical values, and metacognition.

Note. The table presents a chronological compilation of the most common research competencies based on a variety of authors.

Source: Authors, (2024).

As shown in Table 1, these competencies have been outlined, respecting the chronological order, based on the development of thinking as a whole, both in the student in training and in the researching teachers. In line with the concept presented by Rubio et al. (2018), the improvement of the quality of higher education goes hand in hand with job competencies, which are managed with the concept of learning to learn, strengthened by the contributions of Phathara et al. (2023), maximizing lifelong learning, emphasizing different learning skills in each academic cycle.

At this point, it is necessary to emphasize the importance of teachers and students engaging in the research process as part of the academic process in each subject, which they will carry out throughout their academic and professional lives, translating into methodical, systematic, and interdisciplinary work (Ayala-Ruiz et al., 2019; Rubio et al., 2018).

Teaching students - prospective teachers - to conduct research through the design of activities that allow metacognition during their own learning and research skills; allowing them to develop activities in a more holistic and dialectical way in their application during their teaching practice sessions, in the educational process and its management, this will foster the personal and professional development of normal students and teachers (García, A., et al. 2022 p. 91).

The aspects highlighted by various authors clearly emphasize the importance of developing research competencies in education through organized, systematic actions that guide the research process. The student, therefore, appropriates knowledge, identifies problems, and becomes part of the construction of science.

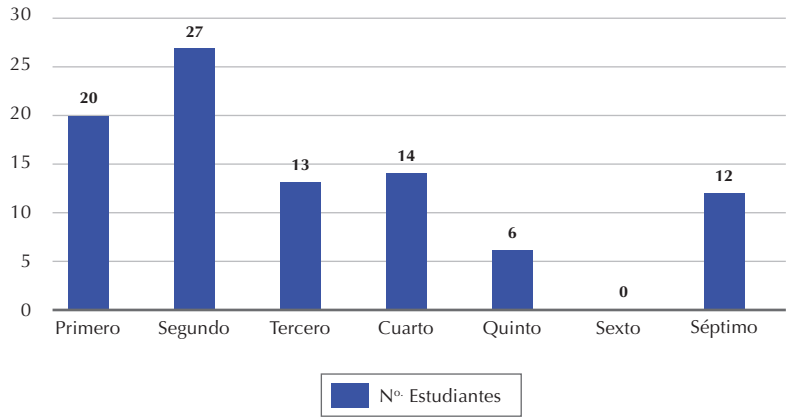
2. Methodology

This study, under consideration, is framed within the phenomenological interpretive paradigm, with a mixed approach, addressing quantitative elements concerning the collection and processing of information, using descriptive statistics; on the other hand, the qualitative aspect is manifested in the analysis of the perceptions and judgments of the teacher trainees regarding the development of research competencies in the process of their professionalization.

The scope of the research is explanatory, with a non-experimental, cross-sectional, bibliographic, and field design. The population consisted of 92 students from the Early Childhood Education program at Salesiana Polytechnic University, who were administered a self-administered questionnaire, yielding 64 responses, for a 70% participation rate. The number of students per semester is represented in Figure 1.

The structured interview was conducted with 17 teachers from the Early Childhood Education program, the selected sample corresponds to the entire universe, covering all 17 professors of the mentioned program, who are distributed across the semesters according to the learning branch (fig. 2). In total, 109 subjects, including both teachers and students, were surveyed.

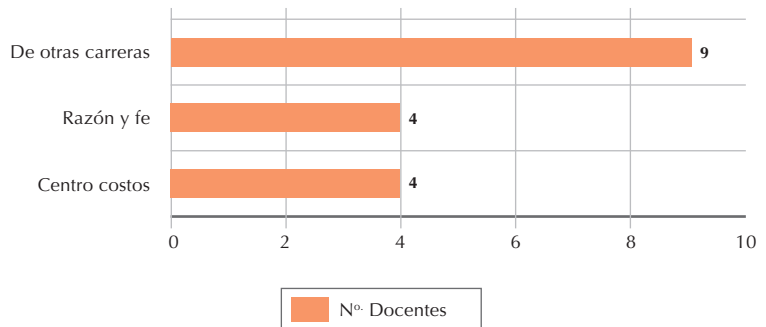
Figure 1. Number of early childhood education students



Note. The data were obtained from the secretary of the Early Childhood Education program, for a total of 92 enrolled students, broken down by semesters.

Source: Authors, (2024).

Figure 2. Number of teachers for the period 61



Note. The table shows the total number of teachers selected for the application of the designed instruments. Information provided by the secretary of the Early Childhood Education program in period 61.

Source: Authors, (2024).

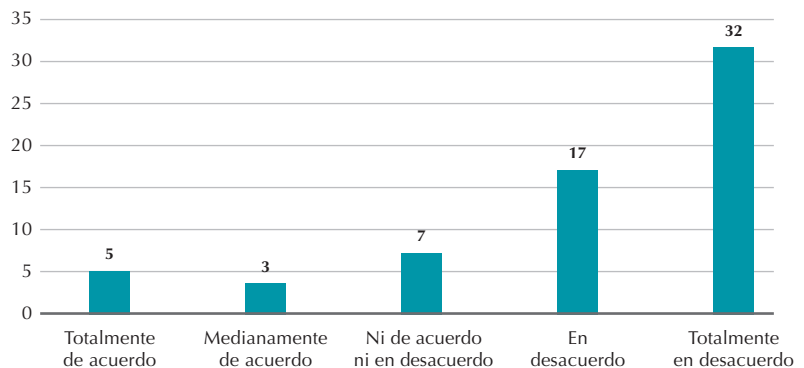
3. Results

When students were asked about whether the activities carried out in classrooms tend towards the development of research competencies, 50% expressed being completely in disagreement, while 27% disagreed.

Another question addressed in the instrument used referred to academic activities and their impact on the development of these competencies. The students considered that classroom activities do not lead to the consolidation of research skills, as demonstrated in their responses, where 50% were completely in disagreement and 27% disagreed. Other responses, such as neither agreeing nor disagreeing, fluctuated at 11%, completely agreeing at 8%, and moderately agreeing at 4%. The intention is for academic spaces to allow both students and teachers to engage in the generation of new knowledge or strengthen acquired knowledge, which entails establishing a set of competencies that the researching teacher must develop during their academic training (Estrada-Cherres, J. et al, 2022).

The academic curriculum does not identify the competencies that students must develop per semester, so the teacher has the freedom to select from the range of competencies and according to the complexity of tasks that the early childhood education student must perform.

Figure 3. Classroom activities in the development of research competencies.



Note. Information provided by the respondents.

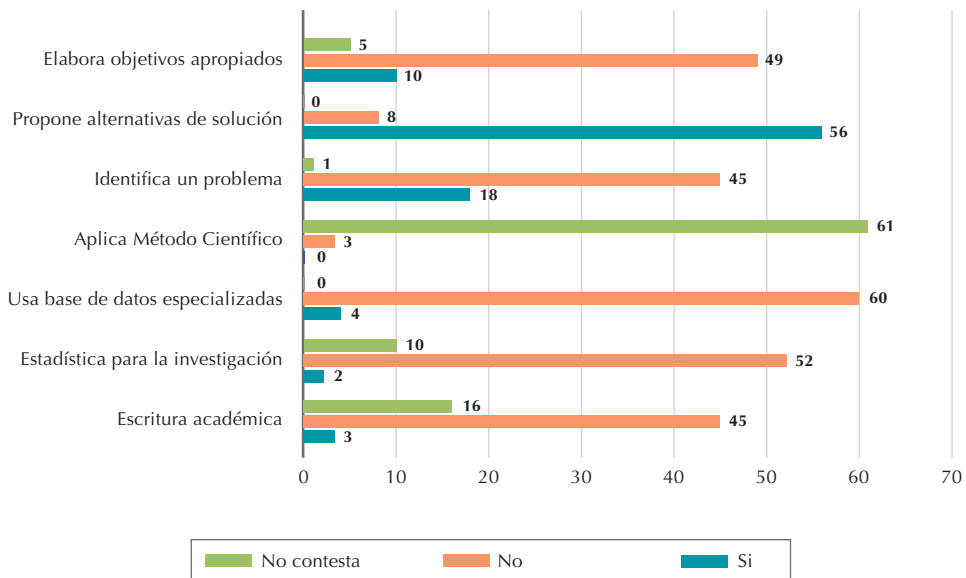
Source: Authors, (2024).

However, the research competencies that students should develop, the responses from the students revealed the need to strengthen them in classroom activities: 77% consider that they do not formulate appropriate objectives; when faced with a problem, although they cannot determine it specifically (70%), they still believe that they propose alternative solutions with 88%. Regarding the scientific method, they consider that they barely use it, with only 7% indicating so. Regarding the use of specialized databases, their response was negative, with 94%; for the use of statistics in research, the negative response was 81%. Lastly, academic writing received a negative response from 70%.

This result highlights the emergent need for multidisciplinary activities with students, meaning activities that involve the subjects of each semester they must pass and include the development of research competencies as a cross-cutting axis.

The knowledge demonstrated by students in their classroom activities, according to the teachers, is indeed scarce, making the selection of appropriate methodological strategies for the researching teacher in training an urgent matter.

Figure 4. Research competencies developed.



Source: Author, (2024).

Teachers predominantly confirm the necessity of developing research competencies in students of the early childhood education program, which will be indispensable for their professional practice. However, these competencies are not typically included in the school curriculum, or they are only briefly addressed. Therefore, teachers propose activities from the earliest stages that involve the use of ICT, active methodologies such as flipped learning, and project-based learning (PBL) aimed at fostering critical thinking, analysis, observation, and the overall scientific method process, whose complexity corresponds to the academic level of the learners.

4. Discussion

The graduate profile of the early childhood education program aims at fostering research competencies in students, with the guidance of the teaching faculty. These competencies should be systematized according to the levels in which they are enrolled, considering observation, analysis, description, synthesis, and interpretation as basic competencies for initiating the research process.

The selection of research competencies should be reflexive in nature, leading the student to be meticulous, committed, innovative, transformative, purposeful, and creative in utilizing their knowledge for the solution of social, educational, business-related, etc., issues.

It is in this context that higher education, in its transformative role in a society dominated by technology and information, consolidates the training of teachers, enabling them to contribute efficiently as professionals at both local and global levels.

The graduate profile of students in the program entails a complex component in the realm of research, which strengthens their professional practice in early childhood education. It is a *sine qua non* factor that strategies be reconsidered and proposed to achieve the objectives and goals of an early childhood education teacher across various academic spaces, engagement activities, and research endeavors.

5. Conclusions

The formation of the researching teacher for early childhood education students is an ongoing construction process facilitated through trial and error, refining competencies that will subsequently be showcased during their professional practice. Structural changes within academia are necessary to result in increased quality among future early childhood education teachers. These changes encompass the development of metacognitive, instrumental, and methodological competencies that converge in research activities.

Research competencies constitute a fertile ground for contributions as a novel area that enriches university endeavors. However, as long as research continues to be perceived as synonymous with unproductive space in classrooms and workplaces, it will remain a limitation. It is imperative to maintain strategies developed through daily practice.

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