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A Systematic Literature Review on Improving Quality of Master Programs through (re)Designing Teacher Training

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Abstract: *Master's education is dynamically evolving worldwide. As M-level programs play a crucial role in improving job prospects for university graduates, our review focused on how a well-designed master's program could train candidates to become proactive and goal-oriented learners as well as practitioner-teachers. The methodology employed in this study was a systematic literature review (SLR) of academic articles that centered on M-level programs. The literature search process involved several stages, including identifying relevant studies for thematic analysis, evaluating their quality, pinpointing patterns and significant results, and discussing the extent of consensus across the research questions posed. The total sample of this SLR comprised 81 studies. Three main typologies were prevalent: theoretical and qualitative studies (n=45), case studies or comparative case studies (n=18), empirical studies (n=14), and a mixed-method approach (n=4). The majority of articles suggested innovative perspectives on M-level program development and delivery (60.94%). Another significant portion of the studies (22.22%) presented experiences or comparative analyses of best practices in M-level programs. A smaller number (17.28%) involved presenting empirical data on the impact of master's training on students' satisfaction or their motivation to pursue a master's program. Thematic analysis confirmed recurring themes on innovative approaches to (re)designing M-level programs and providing comprehensive data systematically, emphasizing the urgent need for universities to (re)design improved programs (also at the master's level) and services to meet the demands of the current and future labor market.*

Keywords: *Higher Education, Teacher Training, Program Design, Hybridization.*

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Introduction

Technology has transformed higher education not only by altering course design and delivery, but also by changing the way universities interact with students (Hainline et al., 2010). Amid challenging economic times (Lake & Pushchak, 2007) and the increasing demand for international education (Altbach & Knight, 2007), the need to prepare students for a global lifelong learning society (Kasworm & Hemmingsen, 2007) has significantly intensified societal pressures on higher education. Master's education is dynamically evolving worldwide, evidenced by the growing number of students, a diversified range of programs, and various implementation mechanisms (Jung & Lee, 2019). The availability of educational programs is influenced by the master enrollment rate (Lake & Pushchak, 2007) and the international mobility of programs and educational providers. However, addressing demands such as affordable tuition costs, immediate employment value for prospective students, and a more thorough consideration of academic needs remains crucial.

As the education and labor market have become increasingly unpredictable, the demand for more skilled, knowledgeable, and professional workers has intensified. Master's education offers advanced training, expected to develop higher levels of knowledge and skills compared to undergraduate education (O'Donnell et al., 2009), which can enhance the job prospects of university graduates (Anderson & Van de Werfhorst, 2010). Jung & Lee (2019) advocate for a comprehensive understanding of students' demands in master's programs (M-level programs) and suggest an expansion of their learning opportunities and career advancement through a structured and comprehensive approach. Societal requirements are placing increasing demands on higher education institutions to actively engage in a global knowledge market and to develop improved student approaches (Marginson, 2006). The dynamic nature of the current labor market compels universities to propose and implement better services that cater to student needs and labor market trends. To effectively respond to these challenges, universities must establish effective strategic planning processes (Lake & Pushchak, 2007).

This new learning paradigm (Curum & Khedo, 2021), delivered through online platforms, encourages education across diverse contexts and underscores the need to adapt learning content with appropriate

instructional design principles to identify key design elements that can better prepare professionals for the ever-changing labor market. The incorporation of online learning in higher education, which opens access to a diverse student population with varying socioeconomic backgrounds and a broad range of experiences (Coman et al., 2020), makes it imperative to equip teachers with the knowledge and competencies to address the needs of their diverse students (Gleason & Cherrez, 2021). To prepare future teachers and a new generation of learners, universities should adapt to their needs and define better-suited learning options for all learners, thereby becoming more flexible to align with diverse goals, meet student needs, and accommodate labor market trends.

Given the current demands for innovative ways to transform teaching practices to better respond to the unpredictability and complexity of the modern world, reallocating funds could support an innovative framework for both policy intervention and the quality improvement of programs delivered by higher education institutions.

Theoretical framework

The vital role of a high-quality teaching profession in raising standards and transforming educational outcomes is widely recognized (Fernandes et al., 2021; Roliak & Humeniuk, 2023). The university's purpose is not solely to prepare students for professional practice, but also to cultivate competent individuals capable of independent, critical, and creative thinking. This study was prompted by previous research that delved into enhancing the quality of programs delivered by higher education institutions. The proposed solution does not entail introducing new teaching methods, but rather re(designing) and re(thinking) existing methods, aligning and integrating them with students' learning capabilities.

The services offered must align with students' expectations, training needs, and proposed objectives, emphasizing the relevance of the curriculum content and activities, and ensuring a correlation between targeted skills and those sought in the labor market. Teaching approaches should be updated in response to the evolving needs of students and the rapidly changing trends in the labor market. Additionally, it is crucial to identify how to teach professional behavior (Medisauskaite et al., 2021). To foster creative problem-solving, teachers should develop design thinking skills (Bressler & Annetta, 2021).

M-level programs in educational sciences are widely utilized as development programs to enhance the quality and professionalism of teaching (Breckwoldt et al., 2014). Master's programs aimed at preparing teachers should establish a framework to train candidates as proactive and goal-oriented learners and practitioner-teachers (Bembenutty et al., 2015). A critical aspect of the solution involves assisting students in better regulating their learning through effective learning techniques. Theoretical knowledge alone is insufficient for today's teacher candidates; therefore, researchers recommend integrating essential self-regulatory learning strategies into the curriculum to empower future teachers in managing their learning processes.

Studies (Jung & Lee, 2019) have highlighted issues with teacher training at the university level, emphasizing that teaching involves not only academic skills but also technical skills. Consequently, teacher training activities should be viewed as professional endeavors based on academic study rather than purely instrumental, operations-oriented, or utilitarian. Preparing future teachers involves fostering strong social connections, necessitating university instructors to collaborate and dedicate more time to course preparation. Teacher professional training entails a systematic and targeted learning approach (Peng, 2019), essential for teachers' professional development.

An M-level program can enhance teaching skills and improve teacher effectiveness and practices through the utilization of real-time coaching, mentoring, immediate feedback (Kooken et al., 2021; Reyes et al., 2021), technology-enhanced learning, and innovative approaches (Stahl et al., 2018). Academic coaching is increasingly becoming a prominent form of student support in higher education (Howlett, 2021). Network training offers an effective means for teachers to develop their profession and engage in lifelong learning (Peng, 2019). Networking fosters connected learning environments that promote a shared sense of purpose, knowledge production, and networked infrastructures (Prestridge, 2021).

Scope of the Systematic Literature Review

Given the dynamics of the current labor market and the increased societal pressure, higher education institutions are required to propose and implement better services to meet student needs and align with labor market trends. As M-level programs play a crucial role in improving university graduates' job prospects, our review focused on

how an effective master's program design can train candidates to become proactive and goal-directed learners and teacher-practitioners. This study builds upon previous research on examining teacher training in higher education and aims to present research on optimizing the (re)design of M-level programs, discussing relevant findings for efficient teacher training delivery.

To achieve the aims of this SLR, our investigative approach was guided by the following research questions:

RQ1: How do universities innovate their M-level programs through curriculum (re)design?

RQ2: What contextual factors support or constrain the development of professional competencies at the master's level?

RQ3: What are the key directions essential in teacher training that can be delivered through a master's program in Educational Sciences?

While there are comprehensive reviews on teacher identity development in higher education settings (O'Byrne et al., 2015; Lankveld et al., 2017), a systematic review specifically focusing on effective master's program design for teacher training is lacking. This SLR aims to analyze the literature and provide an overview of current critical factors for program design in higher education. A primary goal is to synthesize the growing body of research that can answer our review questions and identify common M-level program instructional designs, curricular frameworks, and educational and practical activities across universities.

An advantage of this comprehensive review is the incorporation of findings from teacher effectiveness research in the design of M-level programs and teachers' professional development training. Consequently, an overview of best practices and other experiences could facilitate the design of M-level programs to better prepare professionals and future teachers for a global lifelong learning society. Therefore, specific studies on each dimension can provide relevant data to enhance the quality of higher education programs. Finally, the effective strategic planning implemented by researchers to improve M-level programs was discussed by analyzing relevant articles to answer the review questions posed and identify specific actions and steps to be taken (e.g., affordable tuition costs, immediate employment value for prospective students, better consideration of academic needs, and curriculum coherence). The methodological study design reveals the literature searches and criteria for article inclusion and exclusion.

Methodology

The methodology adopted in this article was that of a SLR of academic articles discussing M-level programs, with a specific focus on the design of Master's programs in Educational Sciences. From a general perspective, the study aimed to provide an overview of current practices in delivering M-level programs in Educational Sciences, recognizing teaching as a complex set of personal and social processes and practices (Fernandes et al., 2021).

Van LankVeld et al. (2017) conducted a literature review emphasizing the need to develop qualitative teacher training and identified four main directions in teacher training: (1) self-development; (2) understanding how learning occurs; (3) transferring knowledge and skills to teaching practice; and (4) sharing experiences and knowledge transfer between teachers. Conducting a SLR serves to facilitate navigation in the fast-growing body of research, enhance methodological rigor, and provide prospective insights for future research directions.

The rationale behind conducting this SLR was to ensure reliable and rigorous knowledge for universities to base their managerial systems on. The literature search process involved several stages (see Figure 1), including identifying relevant studies aligned with our research aims, assessing their quality, identifying patterns and significant results, and discussing the extent to which consensus is shared across the raised research questions.

Step 1. Clear definition of research questions was undertaken to define the research directions of the study more precisely. The key concepts identified revolved around (1) "master program," (2) "master design," (3) "teacher training," (4) "course design," (5) "higher education," with a filter for the subject areas of social sciences and/or education. During this initial stage, we gathered relevant insights into the general framework of master's programs, including their challenges, resources, and future problem-solving in consideration of the hybridization of higher education (Graf, 2013).

Step 2. Initial database search and literature identification. We conducted a literature search via various internet databases, including Web of Science, ScienceDirect, Elsevier's Scopus, Springer, and Google Scholar, containing important journals on Higher Education relevant to our research topic. These searches, based on keywords such as higher education, master program, teacher training, learning design, and educational sciences, generated over 22,490 works (articles, proceedings,

book chapters, conference papers). We included studies only from peer-reviewed journal articles published in English (see Table 2). The time span was established for articles published after 2012, resulting in a sample of 1076 journal articles.

Stage 3. Selection and exclusion criteria. We used further search criteria to narrow down the initial 1076 articles to specific disciplines related to our study objectives. The papers were downloaded, and their abstracts were read. Selection and exclusion criteria were implemented to identify the research target group. The selection process provided data on important implications for M-level program designing based on broad criteria. Studies that (1) did not provide sufficient descriptions of concrete directions in master design (from curriculum technology and learning environments to vision and philosophy); (2) did not offer specific intervention on master design; (3) did not focus on an M-level program or a postgraduate educational context were excluded. The issue of selection bias in higher education studies (Titus, 2007) was also considered. After this step, the total number of studies significantly decreased. Based on the research review questions and objectives and the aforementioned criteria, 465 articles were selected, and the others were excluded. During this stage, upon the title and abstract screening, it was observed that the vast majority of the research applied qualitative methods. The analysis of studies that rely on qualitative research methods requires a thorough and close reading. Consequently, the sample was narrowed down to studies with relevant contributions to master improvement, resulting in an additional 384 articles being excluded based on the criterion that these studies did not answer our SLR research questions (i.e., sensitivity analysis, Thomas & Harden, 2008). As a result, a sample of 81 research papers was finally selected and approved for a thorough analysis.

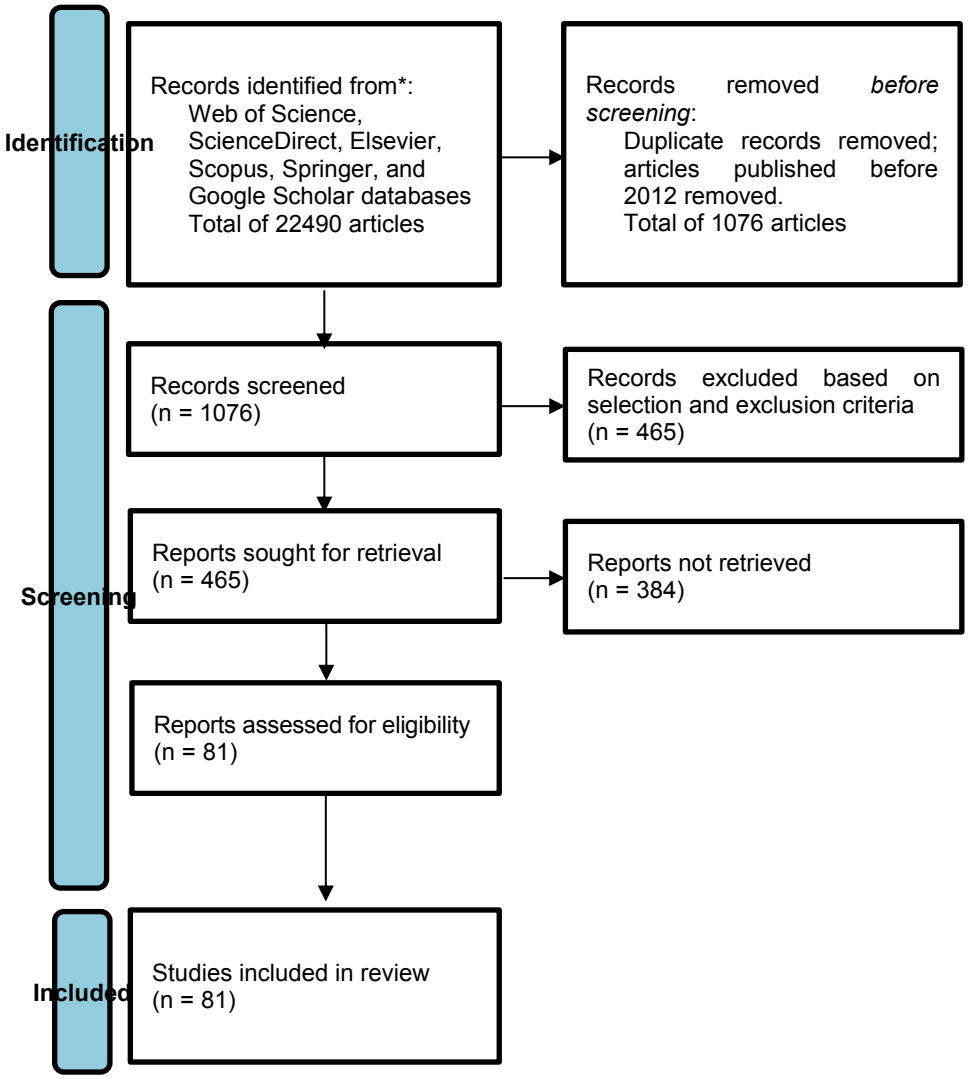


Figure 1. Methodological stages for the SLR implementation

Stage 4. Summary of the studies reviewed, data extraction, and coding. The 82 articles were analyzed and coded using a standardized procedure for data coding, performed for all 82 papers. The two reviewers (GD/FB) independently assessed the methodological quality of the included papers, based on the *Weight of Evidence Framework* (Gough, 2007), which examines the quality and relevance of studies, considering three main aspects: A) the integrity and solidity of the studies; B) the suitability of

the study design for answering the research questions; and C) the relevance of the study outcomes for the SLR. All data obtained were coded and listed as follows: (1) Author(s); (2) Title; (3) Year of publication; (4) Journal; (5) Number of citations; (6) Research question(s) and/or hypothesis (hypotheses); (7) Methodology; (8) Instruments; (9) Target group (Master programs); (10) Geographical area covered; (11) Results.

Stage 5. Descriptive analysis. During the fifth stage, an analytical framework was elaborated (Figueiró & Raufflet, 2015), along with a thematic reading guide and coding system. Building an analytical framework is the most appropriate way to organize the findings of an SLR, as it eases the result analysis and interpretation, providing more insights into the assumptions, procedures, evidence, and conclusions of the study researchers. A coding system was developed, which included (1) target group (master program); (2) research questions; (3) the study methodology; (4) the geographical area covered; (5) results; and (6) conclusion relevance for master program or course design. The first ten articles were analyzed by two researchers in pairs to establish the procedure for data extraction, and in cases of ambiguity or uncertainty, a third researcher was consulted to reach a consensus. The results were thoroughly and carefully analyzed and synthesized primarily through qualitative analysis, given the considerable variety of study designs, research methods, and findings.

Stage 6. Thematic analysis. Since the SLR aims and research review questions are inclined towards a qualitative process, and considering that most of the selected articles were qualitative, we employed a qualitative synthesis to organize, analyze, and interpret all relevant data through interpretive, comparative, pattern, and relational analyses (Bazeley, 2013). Our objective was to systematically organize, summarize, and identify trends and patterns to gain a conceptual understanding of the innovation in higher education at the master's level. In this final stage of the SLR, a comprehensive qualitative analysis was conducted, and recurring themes and patterns in the development and redesigning of M-level programs were identified and comprehensively integrated. The main aim was to recommend a selection of evidence-based measures that could support an innovative approach to M-level program delivery.

Results

The studies on M-level programs for teacher training were primarily selected from the knowledge area of Education/Educational Research, as opposed to other fields (see Table 1).

Table 1. Knowledge area (Discipline)

Discipline	n
Higher Education	323
Science Education	155
Mathematics of Education	93
Sociology of Education	84
Educational policy and Politics	51
Education in general	51
Teacher and Training Education	51
Learning and instruction	49
Educational Technology	49
Child and School Psychology	38
Philosophy of Education	35
Medical Education	22
Assessment, Testing and Evaluation	22
International and Comparative Education	15
Technology and Digital Education	13
Language Education	9
Early Childhood Education	8
Management	8

We used keywords (master program, master design, and teacher training) and a filter for the social sciences or education area, resulting in the identification of 1076 papers published between 2012 and 2021 (Figure 2). However, we also included some influential earlier work for our SLR, and some studies (Goodnough, 2010; Kasworm & Hemmingsen, 2007; Terenzini & Pascarella, 1991), often cited, were included in our SLR as well.

Table 2. Working language (n=1076)

Language	n
English	1040
German	20
French	14
Dutch	1
Spanish	1

It is evident that higher education and professional preparation at the master's level have garnered growing interest, leading to an increase in the number of papers published since 2012. Consequently, a new filter was applied based on our research objectives, narrowing down the selection to specific knowledge areas while excluding others. As a result, the number of articles was reduced to 456 works, spanning disciplines such as Higher Education, Educational Policy and Politics, Teacher and Training Education, International and Comparative Education, Early Childhood Education, and Management. The additional domains were retained in our SLR due to the relevance of Master's in Educational Sciences in Romania, particularly focusing on Educational Counseling, Early Childhood Education, and Educational Management. During the third stage, the sample was further refined to 81 articles. A diverse range of international journals featured articles on higher education research, with the majority of master's research appearing in journals such as Higher Education (30 articles), Innovative Higher Education (7 articles), TechTrends (6 articles), Education Policy (4 articles), Journal of Educational Change (3 articles), and European Journal of Higher Education (1 article).

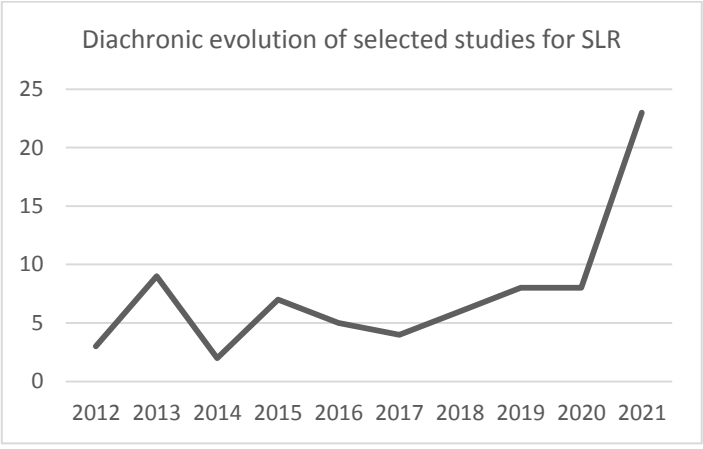


Figure 2. Diachronic evolution of selected studies for SLR on M-level programs

The five most widely cited works analyzed in our SLR are as follows: Bovill et al. (2016) with 406 citations, Yang & Welch (2012) with 195 citations, Coman et al. (2020) with 180 citations, O'Byrne et al. (2015) with 112 citations, and Holmes et al. (2015) with 88 citations (refer to Table 3).

Table 3. The most cited articles from the research sample

Authors	No of citations
Bovill et al. (2016)	406
Yang & Welch (2012)	195
Coman et al., (2020)	180
O'Byrne et al., (2015)	112
Holmes et al. (2015)	88

All 81 articles exploring M-level program development were independently reviewed by two researchers in pairs (GD and FB). Using the conceptual framework identified by the research team, along with study aim and research questions, the researchers extracted various data points, including the study title, program name, research questions, study methodology/instruments, results, and relevance of conclusions for M-level program development or course design. An assessment of the study's impact on the knowledge space was conducted to identify the research impact and its application in developing an innovative framework for both policy intervention and the enhancement of M-level programs in higher education.

An important aspect of our SLR was the geographical area considered in the study, as national socio-economic, political, and cultural contexts can impact the demands on higher education and priorities for M-level program delivery (Stephens et al., 2008). The majority of the articles from the SLR sample focused on M-level programs from Europe (30.86%), the USA (27.16%), and Asia (14.81%). Based on the prevalence rate and concentration of studies, the explored M-level programs originated from the USA (n = 20), Denmark (n = 18), China (n = 9), the UK (n = 3), Australia (n = 4), New Zealand (n = 2), Iceland (n = 1), the Netherlands (n = 2), South Korea (n = 1), France (n = 2), Japan (n = 1), and others. Additionally, two studies explored M-level programs originating from multiple countries (Europe and the USA; Finland and Indonesia; the US and the UK; the UK, Denmark, and Portugal; Finland and the USA; the UK, Portugal, and Denmark). However, considering the growing body of ongoing studies on higher education, the experiences, and study findings from the research sample provided a reference point for comprehensive knowledge and expertise on master's development and innovation, with a significant impact on developing countries aiming to transform higher education practices and better respond to the unpredictability and complexity of the

contemporary world. Regarding developing countries (Indonesia, n = 3; Romania, n = 2; Republic of Kazakhstan, n = 1), there is a notable interest in studies emphasizing the engagement of universities in redesigning M-level programs that could provide advanced training expected to develop higher levels of knowledge and skills. In some other studies, the geographical area of the M-level programs was not specified (n=14) (see Table 4).

Table 4. Geographical areas

Geographical areas	n
Europe	25
USA	22
Asia	12
South America	3
Australia and New Zealand	3
Middle East	2
Not specified	14

When it comes to the methodological framework for the selected studies for our SLR, three main typologies were predominant: theoretical and qualitative studies (n=45), case studies or comparative case studies (n=18), empirical studies (n=14), and mixed-method approaches (n=4). The increased number of theoretical-conceptual studies done in higher education is due to the dynamic and constantly evolving phenomenon addressed in our SLR. The greatest number of articles suggested innovative perspectives on M-level programs development and delivery (60.94%). Another important bunch of studies (22.22%) presented experiences or a comparative analysis of best practices of M-level programs. Fewer studies selected for our SLR (17.28%) considered presenting some empirical data on the impact of master training on students' satisfaction or students' motivation to pursue a master program. Thematic analysis confirmed some recurring themes on innovative approaches to (re)designing M-level programs and providing relevant data in a systematic and comprehensive way, focused on the urgent need for universities to (re)design better programs and services to meet the dynamics of the current and future labor market. In the last two decades, there has been an increase in interest in re(thinking) and re(designing) M-level programs, materialized in a considerable number of Master's degrees available. Nowadays, considering the global pandemic, which led to a forced online learning

environment and is heading to a strong hybridization of higher education, it is imperative for universities to transform their programs and services to become more flexible, to develop online and hybrid courses, identify and enhance academic and social support, and allocate resources to mental health (Prokes & Housel, 2021).

From the total sample of 81 studies, 65.47% provided no information regarding the area or the domain of the M-level program. From the remaining 31 studies (29.62%) were focused on the academic fields of education or teacher training, whereas 7.40% explored M-level programs from other disciplines. The extracted data were analyzed and synthesized using thematic qualitative analysis and were coded deductively under some specific themes relevant for this SLR (to contextual factors, background, outputs, outcomes, and relevance). Under each theme, a set of common characteristics was identified across several studies (presented in Table 5).

Table 5. Themes and sub-themes on factors with a great impact on M-Level Program (re)Design

Themes	Characteristics	Studies
Contextual background	Status and identity of the master degree	Sin (2012)
	Resistance to curriculum reform	Mause (2013)
	Institutional finances and resources	Warshaw et al. (2021)
	Organizational context	Warshaw et al. (2021)
	Institutional and state controls	Warshaw et al. (2021)
	Huge demand of science teachers (China)	Liu et al. (2015)
	Specific, targeted policies for master internationalization	Shimauchi & Kim (2020)
	Shared foundations between programs	O'Byrne et al. (2015); Fages & Albe (2015)
	The threat due to the need to minimizing costs without compromising access and quality of educational providers	Titus et al. (2017)
Outputs and outcomes	Online innovative teaching techniques and tools	Jiang et al. (2021); Coman et al. (2020); Holmes et al. (2015); Tuhkala & Kärkkäinen (2018)
	Closer integration of research and practice; Strong research element	Cornelissen et al. (2013); Wichmann-Hansen et al. (2015); Sin (2012); Liu et al. (2015); Li (2020); Afdal (2017)
	Intensive interaction lecturers - students	Taylor et al. (2015); Wichmann-Hansen et al. (2015); Guzzardo et al. (2021); Terenzini & Pascarella (1991)
	Learning environment (multidimensional and multidirectional); Inclusive learning environment	Silva et al. (2019); Thomsen (2021)
	Flexibility (tailored to the context of first-year students' needs, their teachers, and universities) of blended learning in course context	Velde et al. (2021)
	Defining clear outcomes and impact; Learning outcomes	Aitken et al. (2019); Sin (2013)
	Teacher identity construction	Maratovna et al. (2021)
	Student engagement, co-creation and student-staff partnership	Bovill et al. (2016); Guzzardo et al. (2021)
	Factors of quality of education of teachers	Juusola & Räihä (2020)
	Establishing a stronger university–preschool partnership; Collaboration between School Districts and Universities	Mörk (2021); Parfitt & Rose (2018); Oonk et al. (2020)
	Curriculum design and re(design); Interdisciplinarity in designing and developing a program	O'Byrne et al. (2015); Taylor et al. (2015); Stanulis & Guenther (2021); Thomas et al. (2016); Gerdtz et al. (2021); Fages & Albe (2015); Sin (2013); Sin (2012); Mishra et al. (2019); Louvel (2013); Baaki & Luo (2019); Terry et al. (2013)
	Curricular adaption	Gu & Lee (2019)

	Curriculum Guide for Social Change	Yob et al. (2016)
	Curriculum development, Curriculum Coherence	Yob et al. (2016); Becher (2021)
	Teachers as flexible designers of learning experiences through the creative repurposing of existing technologies	Terry et al. (2013); Tuhkala & Kärkkäinen (2018)
	Priority on practice; Knowledge-for-practice, knowledge-in-practice, and knowledge-of-practice	Scheurkogel (2006); Di Meglio et al. (2021); Taylor et al. (2015); Goodnough (2010); Cornelissen et al. (2013); Liu et al. (2015)
	Pedagogical content knowledge in teacher training	Harju-Luukkainen et al. (2019)
	Supervision Master's students; Peer learning; Collective supervision; Group supervision	Wichmann-Hansen et al. (2015); Nordentoft at al. (2013); Tuhkala & Kärkkäinen (2018); Millin et al. (2021)
	Reflective practice: reflective thinking; refection in and on action; Collaboration and collective knowledge.	Song (2020); Oonk et al. (2020)
Relevance	Building a culture for innovation, entrepreneurship, or transformation	Hall & Lulich (2021); Perry (2014)
	Values building	Fages & Albe (2015)
	Enhancing employability rate	Thirunavukarasu et al. (2020)
	Integration of care into pedagogy	Tang & Walker-Gleaves (2021)
	Culture of participatory learning through the integration of social media, social scholarship and open sharing of ideas and resources	O'Connell (2016)
	Responsible Research and Innovation	Tassone et al. (2018)
	Research-oriented teaching in higher education	Böttcher & Thiel (2018); Millin et al. (2021)
	Research Mentoring Program	Horowitz & Christopher (2013); Afdal (2017); Millin et al. (2021)
	Global Collaboration and Empowered Learning; Design-Based Thinking in Educational Technology; Design-Based Thinking and the Virtual Exchange	Gleason & Jaramillo Cherrez (2021); Cornelissen et al. (2013); Mishra et al. (2019); Oonk et al. (2020); Curum & Khedo (2021); Tuhkala & Kärkkäinen (2018)
	"Research-based" and "profession-oriented" programs	Afdal (2017); Millin et al. (2021)
	Network psychometric approach	Mladenovici et al. (2021)
	Student-centered evaluation	Hakkola & King (2016)
	Technology transfer	Yang & Welch (2012); Curum & Khedo(2021); Tuhkala & Kärkkäinen (2018)
	Experiential Learning and Ambitious Teaching Framework	Stanulis & Guenther (2021); Gleason & Jaramillo Cherrez (2021)
	Learning analytics as a tool for defining improvement strategies and actions.	Sáenz-Castro et al. (2011)

The common characteristics identified provide a more solid pathway for universities to develop and redesign M-level programs to have a greater impact on the personal and professional level of the master's students, as well as on socio-economic and cultural development. The examined studies provided relevant data to consider when redesigning the curriculum for training teachers in the university context at the M-Level: a coherent approach to research and practice (Cornelissen et al., 2013; Wichmann-Hansen et al., 2015; Sin, 2012; Liu et al., 2015; Li, 2020; Afdal, 2017; Becher, 2021); strengthening university-preschool partnerships (Parfitt & Rose, 2018; Oonk et al., 2020; Mörk, 2021); research-oriented teaching and research mentoring in higher education (Horowitz & Christopher, 2013; Afdal, 2017; Böttcher & Thiel, 2018); interaction with master students, collaboration, and learning co-creation within a student-staff partnership (Bovill et al., 2016).

Discussions

M-level programs innovation through curriculum (re)design (RQ1)

Impressive data collected during the SLR suggest a framework for an M-level program. Social participation (O'Connell, 2016) and knowledge co-construction (Bovill et al., 2016) continue to be essential in higher education programs. Louvel (2013) proposes renewing a curriculum rather than designing it from scratch by identifying a 'repertoire of resources' and reinventing and integrating them with a deeper analysis for creative solutions. Louvel (2013) compares the program design activity with the bricolage concept, suggesting that innovation in academia comes from building upon a solid foundation that already exists, including courses, equipment, financial and institutional support, partnerships, and networks created.

Coherence is another important aspect identified during our SLR. It is recognized by scholars (Afdal, 2017; Mishra et al., 2019; Jiang et al., 2021; Becher, 2021; Mörk, 2021) as crucial for program design in higher education. Coherence involves harmonizing both theoretical courses, taught by faculty teachers to prepare professionals and generate knowledge, and practical activities, setting the professional practice that heavily relies on accompanying practitioners. This alignment between curricular components and learning environments ensures a coherence in the vision of key knowledge crucial for teacher education. Several studies from our SLR express concerns about a discrepancy between the theory that master students learn and its practical applications in the field. Poorly designed

courses can increase confusion, frustration, and discourage learners (Curum & Khedo, 2021).

Perceptions of students on instruction and instructional practices are especially important in higher education (Culver et al., 2021), and data from their learning needs assessment provide important implications for master training design. Effective pedagogical techniques that ensure students' content learning, cognition, psychosocial development, and success in college are identified (Pascarella & Terenzini, 1991; Mayhew et al., 2016; Seifert, 2017). Practical activities should integrate a broad spectrum of educational knowledge encompassing cognitive, interpersonal, and organizational dimensions of the teaching profession, as well as aspects of practice (Hordern, 2015; Mörk, 2021). M-level programs in educational sciences often provide connections between theory and practice, university courses, and practicum components, focusing on integrating tasks in teaching practice and various aspects of classroom management and cognitive aspects of learning and teaching. Collaborative activities, such as group assignments, discussion tasks, or study groups with peers, are also commonly organized (Tuhkala & Kärkkäinen, 2018).

Teaching formats may include scenario teaching and discussion groups, aiming to acquire practical skills. Böttcher & Thiel (2018) highlight that research competences are not clearly defined in the literature, making it difficult for faculty to work and develop something that they cannot easily identify. They propose a model consisting of five definitions to help understand the concept of research competence that can be developed during M-Level programs (presented in Figure 3). The model was tested across various academic disciplines, including Bachelor's, Master's, and PhD levels.

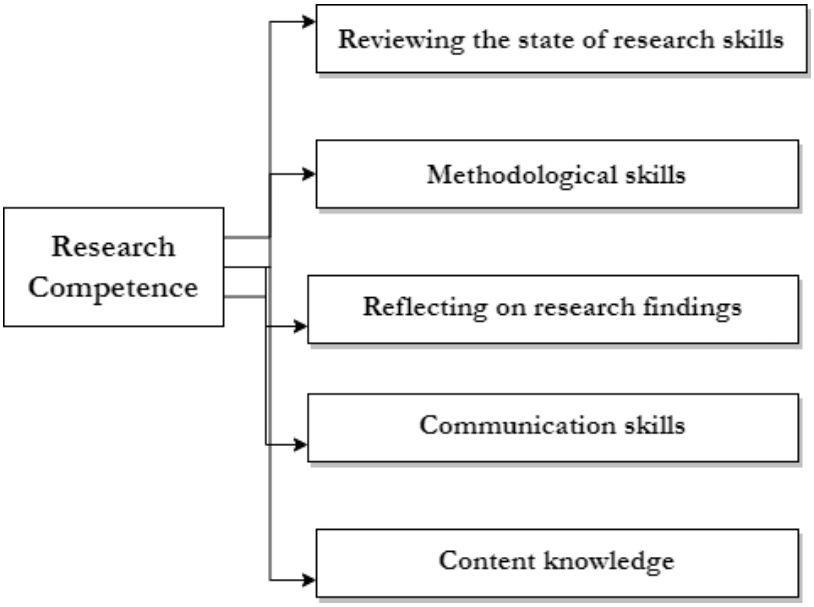


Figure 3 Research competence proposed by Böttcher & Thiel (2018)

Facilitators and barrier factors in the development of professional competences at master's level (RQ2)

Studies (Guzzardo et al., 2021) have identified some good practices to reduce graduation gaps in higher education. These practices involve establishing a more direct relationship between faculty and their students, creating a common and more inclusive pedagogical space, and fostering an engaging learning environment for both faculty and students. Collaborative activities provide students with opportunities to share experiences, discuss encountered problems, and build networks, which facilitate learning (Tuhkala & Kärkkäinen, 2018). A well-designed education system promotes collaboration among students, teachers, researchers, and practitioners, allowing the formulation and implementation of various solutions and facilitating knowledge transfer from theory to practical situations (Taylor et al., 2015; Wichmann-Hansen et al., 2015; Terenzini & Pascarella, 1991).

Cooperation in learning creates interactive spaces where individual interests, networks, and interdependent relationships with interconnected experiences can meet and grow, transcending temporal, spatial, and cultural boundaries (O'Connell, 2016; Prestridge, 2021). The development of student-teacher relationships is an important resource that facilitates individual development (Liang et al., 2021). Master students should receive

suggestions, information, and knowledge from their teachers to successfully complete their studies and research (Aikens et al., 2016). Moreover, teachers can provide psychosocial support for students, such as encouragement and sharing personal stories of struggle, which can help students reduce their feelings of helplessness and frustration and persist when faced with difficulties (Crisp & Cruz, 2009). These collaborative activities include building learning communities, communities of practice, and teacher networks (see Table 6). Unfortunately, in a culture of content mastery, students often spend more time following instructions and less time working in open-ended environments to cultivate their problem-solving strategies (Gleason & Jaramillo Cherrez, 2021; Song, 2020). Studies (Tang & Walker-Gleaves, 2021) show that through active participation, cognitive investment, and emotional commitment to learning, academic performance is higher. This implies the contribution of all actors, including the lecturer or course developer and the master student(s) (Tassone et al., 2018; O'Connell, 2016; Song, 2020; Oonk et al., 2020; Bovill et al., 2016; Guzzardo et al., 2021).

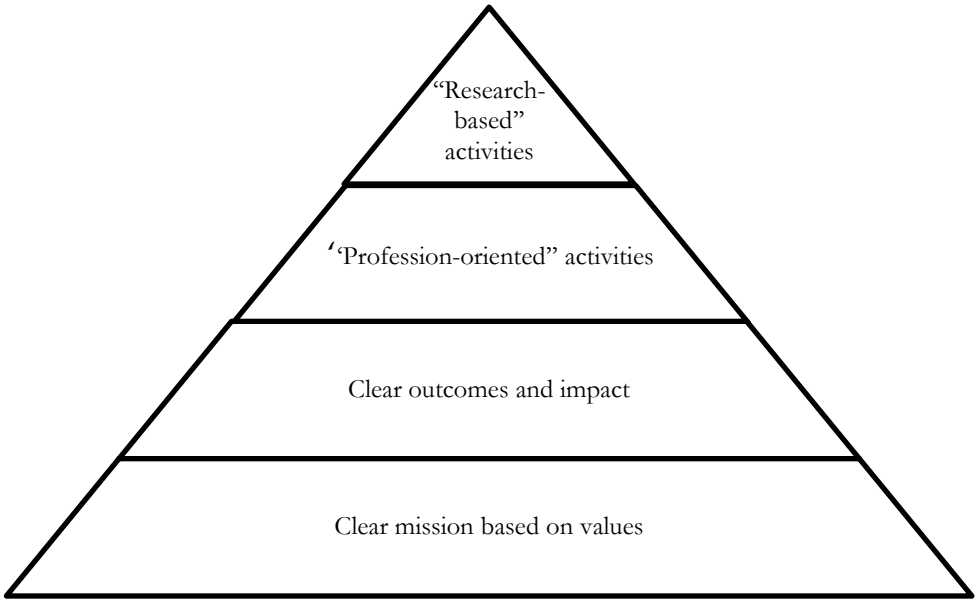


Figure 4. M-Level Program Competency Framework (Fages & Albe, 2015; Aitken et al., 2019; Sin, 2013; Afdal, 2017).

Some of the difficulties identified in our SLR towards (re)designing and shifting to more innovative M-level programs include the resistance to curriculum reform, as identified by Mause (2013) in a comparative study that analyzed the factors that can trigger or hinder higher education reform.

Consequently, opponents of Master's reform convey a certain adjustment between the M-Level Program providers (universities, professors) and beneficiaries (students, employers). Presenting a case study in Germany, Mause (2013) suggests that more subtle factors, such as soft governance and advocacy coalitions, have significantly pushed forward Bachelor/Master reform despite its resistance.

To generate and guide new and policy-relevant knowledge and practices toward meaningful higher educational reform, our SLR revealed several facilitators, such as clarifying the status and identity of the master degree in relation to Bachelor and Doctoral studies (Sin, 2012), identifying all institutional finances and resources (Warshaw et al., 2021), considering the organizational context, including institutional and state controls (Warshaw et al., 2021), developing specific, targeted policies for master internationalization (Shimauchi & Kim, 2020), sharing foundations between programs (O'Byrne et al., 2015; Fages & Albe, 2015), and creatively (re)thinking existing programs and joining them interdisciplinary (Louvel, 2013; Fages & Albe, 2015; Taylor et al., 2015) (see Figure 4).

Another relevant aspect extracted during our literature review was the peril that threatens higher education quality - the need to minimize costs. Consequently, scholars should identify ways to become more financially efficient without compromising the access and quality of educational providers (Titus et al., 2017). Several articles suggest hybridization of M-Level programs (Harrison, 2007; Jiang et al., 2021; Coman et al., 2020; Holmes et al., 2015) as a possible solution forced by the global COVID pandemic.

Teacher training provided through M-Level Programs in Educational Sciences (RQ3)

Some studies were specific in providing several pedagogical activities and learning opportunities that can help shape a collective synthesis of essential elements of an M-level program. Most required theoretical courses in educational studies focused on general pedagogical knowledge (Harju-Luukkainen et al., 2019), online innovative teaching techniques and tools (Jiang et al., 2021; Coman et al., 2020; Holmes et al., 2015; Terry et al., 2013), knowledge on how to build an inclusive learning environment (Silva et al., 2019; Thomsen, 2021), reflective practice: reflective thinking; reflection in and on action (Song, 2020; Oonk et al., 2020), integration of care into pedagogy (Tang & Walker-Gleaves, 2021), research-oriented teaching in higher education (Böttcher & Thiel, 2018) and in preparing science teachers (Liu et al., 2015), design-based thinking and virtual exchange (Gleason &

Jaramillo Cherrez, 2021), assessment and evaluation techniques, more student-centered (Hakkola & King, 2016).

When it comes to teaching practices, several studies regarded educational practice as decontextualized from subject matter expertise. Shin (2021) provided a theoretical framework for teacher competence development, which can guide any program that seeks to train teachers. Some studies (Oonk et al., 2020) state the need for the teacher to engage with society, which directs higher education toward more university-society-oriented perspectives. Hence, the new perspective promotes the building of a university-society collaborative learning setting. Across studies, a profile of the teacher can be developed, as follows:

Table 6. Teacher's roles

Competences and roles	Source
Co-participant Expert Curriculum innovator Process facilitator Student coach and mentor	Oonk et al. (2020)
Supervisor	Nordentoft at al. (2013)
Flexible learner and designer	Velde et al. (2021)
Life-long learner	Mörk (2021)
Knowledge generator	Goodnough (2010)
Invisible caregiver	Tang & Walker-Gleaves (2021)
Innovator	Hall & Lulich (2021)
Researcher	Juusola & Räihä (2020); Cornelissen et al. (2013); Afdal (2017); Böttcher & Thiel (2018)

Several studies discuss the importance of supervision and fostering a strong and productive supervisory relationship, emphasizing the individual and relational aspects of the supervision process (Nordentoft et al., 2013). Learning happens when students participate, and on the basis of the rationale of active engagement, master programs should be oriented toward more interactive learning opportunities that enhance collaboration (Gleason & Jaramillo Cherrez, 2021), and develop core academic competencies in collective academic supervision (CAS) (Nordentoft et al., 2013). The teaching profession, 'specialized professional practice' (n=7) makes workplace learning difficult, so studies (Caspersen, 2015) propose studying new empirical connections between teachers' learning activities at work and recommend creating educational and learning opportunities to engage active

and independent study strategies. New possibilities for teacher network training are developed by online learning. Adaptation to the online environment would imply instant sharing of learning contents, opportunities to engage and participate in chat forums or webinars for exchanging knowledge outside classroom space and time (Curum & Khedo, 2021). As students tend to be regularly connected to social media platforms, learning is conducted in a self-paced mode with advanced interactions through online communities. Other studies (Creemers et al., 2013; Koulianou & Samartzi, 2018) revealed the need to develop reflection and critical thinking as important elements in all aspects of learning and performance.

Other key elements are motivation, support in learning, positive attitude (Özütürk & Hürsen, 2014), creativity (Piddubna et al., 2022), group learning techniques with an attempt to introduce students to real-world experiences before graduation (Mordovtseva et al., 2023). The main findings of teacher effectiveness research should be taken into account in designing M-level programs and teachers' professional development trainings. However, there is a lack of existing analysis on the influencing factor of technology acceptance of mobile-based teacher professional training (Peng, 2019). Perceptions of students on instruction and instructional practices are especially important in higher education (Culver, et al., 2021), and the data from their learning need assessment provide important implications for master training designing due to the identification of effective pedagogical techniques that ensure students' content learning, cognition, psychosocial development, and success in college (Pascarella & Terenzini, 1991; Mayhew et al., 2016; Seifert, 2017). Other studies (Mörk, 2021; Millin et al., 2021; Mladenovici et al., 2021) suggest that teachers should acquire the requisite expertise through 'practice immersion' and extensive practical experience in schools. New possibilities for teacher network training are developed by online learning. The adaptation to the online environment would imply instant sharing of learning contents, opportunities to engage and participate in chat forums or webinars to exchange knowledge outside classroom space and time. Some main directions relevant for teacher training were identified during this SLR, as in addition to the ones stated by Van LankVeld et al. (2017) at the beginning of the study: (1) self-development; (2) solid knowledge on learning; (3) generating and transferring knowledge through teaching practice; (4) good research skills that would enable them to make good decisions on how to make learning happen and to improve their teaching every day (5) knowledge and experience transfer between teachers. Harrison (2007) strengthens the idea of developing a genuinely student-centered university, fostering teacher professionalism (beliefs, values, and

behaviors) not only inside the auditorium but outside as well, by developing communities of learners.

Conclusions

Our SLR contributes to the literature in several ways. It offers organized, synthesized, and analyzed data from a large source of literature with a focus on revealing several important implications for future educational practice in higher education. First, the large number of papers on improving M-level programs highlighted the increasing importance of research in higher education. Unfortunately, specific papers on curriculum reform and (re)design of M-Level programs, considering the increasing and extensive digitization of higher education, are not as prevalent. Less work was identified in Teacher Training M-Level Programs, and the SLR was extended to identify aspects that might be relevant to a teacher training program from across other disciplines.

This SLR provides important data to support the design and revision of evidence-based practice curricula within M-Level programs by emphasizing not only the course re(design) with a closer integration of research and practice but also re(thinking) the way universities and faculty interact with students. The SLR urges the universities to propose and implement better services for student needs in accordance with labor market trends. There is an increased demand for teachers (Liu et al., 2015), which raises the urgency to improve the quality and professionalism of teaching by developing M-level programs in educational sciences. High-quality teacher training will impact and transform educational outcomes at all levels. A thematic table was drawn to suggest some relevant aspects identified in our study sample to support an innovative framework for policy intervention for (re)thinking higher education programs.

This study identifies a framework to provide demanders of M-Level Programs with learning opportunities to become proactive and goal-directed learners and teacher-practitioners. Particularly prevalent in M-Level programs across disciplines, and in teacher training as well, was the need for universities to improve practices to better support the experience of Master's research students and offer more research-oriented teaching in higher education (Böttcher & Thiel, 2018; Millin et al., 2021), research mentoring programs (Horowitz & Christopher, 2013; Afdal, 2017), and quality research skills development. As shown in this SLR, a great body of literature exists to support universities in re(thinking) their programs and services.

Limitation of the study: Some limitations should be taken into account when considering our SLR findings. First, this review focused on

studies with a direct impact on Educational Sciences and Teacher training M-level programs and thus excluded a large body of research that focuses on other areas. We believe these research findings should be exploited from an interdisciplinary perspective more intensively. The absence of a universal framework for a master development program appropriate for any local, national context, and specificity of the study area, and the diverse and great body of research complicate the process of an SLR. Due to our SLR aims and research questions, the inclusion criteria mostly favored qualitative studies, as quantitative studies are usually oriented to specific and narrow research questions. Additionally, qualitative studies pursued an exploratory analysis, which makes it difficult to provide a specific measuring process. Another important aspect is that most studies discussed general aspects of M-level programs and provided limited information on the programs and on the context explored.

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Compliance with ethical standards: The research did not involve any human participants or animals.

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