PRACTICE

Contemporary Issues in Practitioner Education

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/rpra20

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To cite this article: Stéphane Colognesi, Christine Wiertz, Marie-France Stordeur, Coryse Moncarey, Stéphanie Oliveri, Catherine Deschepper, Sabine Van Mosnenck, Pol Bollen, Louise Leroux, Caroline Poncelet, Tabatha Forster, Corinne Benselin, Virginie Deprez, Pauline Declercq, Solène Verryken & Vanessa Hanin (28 Jun 2024): A collaborative approach to help future teachers plan their teaching: the Prep.AR tool, PRACTICE, DOI: 10.1080/25783858.2024.2372259

To link to this article: https://doi.org/10.1080/25783858.2024.2372259

Published online: 28 Jun 2024.

PRACTICE
https://doi.org/10.1080/25783858.2024.2372259

Routledge
Taylor & Francis Group

A collaborative approach to help future teachers plan their teaching: the Prep.AR tool

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ABSTRACT

The planning of lessons holds a significant place in the training of future teachers, but it also presents various challenges, such as the integration of innovative pedagogical practices advocated in the training programme and the resulting cognitive overload. Differences among trainers regarding preferred practices create uncertainties for prospective teachers. To address these issues, we conducted a collaborative three-year research project. The group, dubbed GCEO, consisted of trainers, teachers, students, and researchers. The research led to a consensus on the practices to be incorporated into teacher training, while recognising the diversity of perspectives and contexts. This consensus, following the research-development principle, materialised through the co-construction of a tool to guide future teachers through the planning stages. We've called the tool, Prep.AR. Prep.AR is an acronym that stands for *Prepare Action Reflection*. It contains various parts. These parts are part of a whole that considers all planning to be based on three types of knowledge: the context, the classroom environment and the learners themselves. Although the tool represents a significant advancement, challenges remain, including its adaptation to different educational contexts and the assessment of its actual impact. Nevertheless, the collaborative approach adopted establishes a crucial link between theory and practice in teacher education.

ARTICLE HISTORY
Received 21 November 2023
Accepted 14 June 2024

KEYWORDS
Collaborative approach; teacher training; lesson-planning

Introduction

Lesson planning holds an important place in pre-service teacher education, as it is one of the essential tasks of classroom practice (Panasuk and Todd 2005, Deprit and Van Nieuwenhoven 2021): anticipating the course and desired outcomes of a teaching situation (Musial *et al.* 2011). However, many difficulties interfere with this process (Konig *et al.* 2020), compromising teaching effectiveness but also influencing the confidence and

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well-being of future teachers (Fives and Buehl 2012). For example, Darling-Hammond (2006) has shown that pre-service teachers face challenges in identifying relevant learning objectives, adapting these objectives to the level of the students and selecting appropriate teaching activities. In addition, time constraints and cultural or contextual differences can also make lesson planning difficult (Mutton *et al.* 2011). Uncertainty about how to balance content-based teaching with attention to students' social-emotional development adds yet another additional dimension of complexity to planning (Korthagen *et al.* 2006). Future teachers must therefore not only master disciplinary content, but also think about creating a supportive learning environment.

These difficulties in lesson planning are often amplified by the need to integrate innovative pedagogical practices promoted in training. The pressure to integrate these elements into the teaching process can lead to cognitive overload and a loss of clarity in lesson conception (Ertmer *et al.* 2012). All the more so as we know that future teachers tend to think that the knowledge promoted by training is too far removed from field realities (Waege and Haugaløkken 2013, Flores 2016). They thus prioritise practical knowledge and, more specifically, the experience of the practicum tutor (Deprit and Van Nieuwenhoven 2018).

To help future teachers plan better, trainers need to make informed choices about the pedagogical practices they encourage, and which should be included in planning. This requires a consensus on which practices to emphasise in training, thus reinforcing coherence between the skills taught and those implemented during internships. But establishing such a consensus among teacher trainers is proving to be a complex task. Indeed, teacher trainers, like future teachers, may have divergent conceptions of what constitutes 'good' teaching practice or 'good' teaching. Moreover, this issue is present in many works, and various appellations refer to it: *professional teaching* (Eraut 2002); *highly qualified teaching* (Darling-Hammond and Youngs 2002); *good teaching* (Sakurai 2012), *excellent teaching* (Chen *et al.* 2012), *effective teaching* (Gurney 2007, Kyriakides *et al.* 2013), *effective teaching behavior* (Van den Hurk *et al.* 2016), *good and effective teaching* (van de Grift 2007).

Moreover, teacher educators often come from a variety of backgrounds and disciplines, which can influence their beliefs and pedagogical approaches (Hanin et al. 2020, 2022). This diversity of perspectives can lead to misunderstandings about the most appropriate practices to promote among future teachers. For example, trainers who favour the traditional teacher-centred approach may disagree with those who favour more constructivist, learner-centred approaches. This divergence can make it difficult to select consensual practices to integrate into training courses and, consequently, to expect future teachers to mobilise them in their lesson planning.

As part of the current reform of teacher training in our country, French-speaking Belgium, teacher educators must focus on these priorities (Derobertmasure *et al.* 2020, Van Nieuwenhoven *et al.* 2021). Furthermore, it is known that increased collaboration between teacher trainers and host schools could help align expectations and reduce disparities between the theory taught at university and the realities in the field (Vescio *et al.* 2008). That's why, in 2018, we started collaborative research aimed at finding this consensus of teaching practices to prioritise. In addition to collaborating, we followed the recommendations of a development research (Harvey and Loiselle 2009) by giving ourselves the concrete task of developing a tool for future teachers listing the practices

that seem to be must-haves for planning/teaching. The group is made up of field teachers at primary and secondary level, teacher educators at the Haute École Pédagogique in various disciplines, and students and junior and senior university researchers.

In the following sections, we report on the process of co-constructing the tool for planning a teaching sequence, and present its main points. We present the theoretical frame of reference that guided us, methodological considerations and the main results, which are discussed, leading at the end of the text to implications for research and practice.

Theoretical framework

As is well known, research and development ' draws on an examination of available theoretical work and previous achievements (. . .)' (Guichon 2007, p. 46). That's why, for our work on co-conception of the tool to help plan, we drew on the work on so-called 'effective' teaching practices available in the literature review. Lopez-Agudo and Marcenaro-Gutierrez (2017) explain that "teachers' effectiveness could be defined as their ability to perform fruitful work in an organised way, using available resources and time without wasting anything (. . .) they have the ability to reach out to their students using their teaching practices to make them learn" (p. 651).

Consequently, several authors have attempted to model and/or identify these practices. For example, Stronge *et al.* (2011) conducted a study to examine the classroom practices of effective versus less effective teachers. To do so, they used fifth-grade students' learning gain scores in reading and maths. This work enabled them to pinpoint four dimensions that contribute to effective teaching, while subsequent studies allow them to be enriched.

The first dimension refers to the way in which content is taught. It considers various sub-dimensions. First, the clarity of objectives. The challenge is for learners to perceive 'why' and 'for what' instruction is being offered to them, and to be informed of the expected outcome (Ko *et al.* 2014, Van den Hurk *et al.* 2016). Eccles and Wigfield (2002) speak of the perceived value of the task: when instruction is perceived as useful, the learner appreciates it more. Secondly, teaching modalities and the variety of approaches. Ko *et al.* (2014) argue that the constructivist or socioconstructivist approach is, in some cases, a condition for learning achievement. In other cases, other approaches will be more appropriate, such as explicit teaching, for example. These authors claim that the approaches are not in conflict with each other. On the contrary, they are all interesting to implement, depending on learning objectives and student profiles. In all cases, the goal is to make students cognitively active (Tricot 2017). In addition to this, planned student interactions (Ko *et al.* 2014, Buchs *et al.* 2017), like cooperative learning, are also evidence-based teaching strategies (Abramczyk and Jurkowski 2020). Dietrichson *et al.* (2017) meta-analysis showed that cooperative learning had very positive effects, particularly among students of low socioeconomic status in elementary and secondary school. Thirdly, consideration of material and technology. Here, teachers' effectiveness increases when, rather than creating everything themselves, they take advantage of existing resources (Ko *et al.* 2014) such as textbooks, for example (Coppe *et al.* 2018). But it has been shown that using technologies for student learning engages new professional tasks for teachers (Colognesi and Hanin 2023). Fourthly, consideration and support for

the learner himself. Support involves adapting approaches to students' varied needs and reactions (Allal 2020), thereby promoting their success (Lery Santos *et al.* 2020). Colognesi and Gouin (2022), in their study of 258 students, identified learner profiles that help predict and adjust support for students according to their needs. Fifth, metacognitive prompting and strategy instruction. This plays an essential role in getting students to monitor and regulate their knowledge, strategies and learning process (Veenman 2012, Allix *et al.* 2023, Demorsy *et al.* 2023). Barbier and Colognesi (2023) analysed the 4-week planning of 18 future first-language teachers in French-speaking Belgium. These future teachers were in their final year of training. The results showed that they made very few plans to solicit students' metacognition.

The second dimension relates to assessment. First of all, assessment is about understanding the learner and monitoring his or her progress. This involves regularly measuring and analysing students' progress with the aim of adapting teaching to their needs (Dietrichson *et al.* 2017, Eysink and Schildkamp 2021, Francotte *et al.* 2023). Then, the teacher can offer the learner appropriate feedback, throughout the learning process, in the form of immediate feedback (Black and Wiliam 2006). In fact, feedback has been identified as one of the most powerful levers for learning (Hattie and Timperley 2007). Finally, there is the question of involving students in the assessment process, through self-assessment, co-assessment or peer assessment (Allal 2020, Wiertz *et al.* 2020, 2022, Stordeur *et al.* 2021). For example, peer assessment is a powerful lever for helping students progress (Leenknecht and Prins 2018, Colognesi *et al.* 2020).

The third dimension relates to the teaching and learning environment and considers aspects relating to classroom management, the organisation of the learning space and students' behavioural expectations. To this end, the teacher can use various classroom management tools to create a motivating classroom environment to support learning (Opdenakker *et al.* 2012, Ryan and Deci 2017). For example, it is known that the support of the environment (Bandura 1997) as well as the feeling of having affiliative relationships with others (Deci and Ryan 2000) are factors conducive to student engagement or not. Poulin and Beaumont (2015) have confirmed the impact of school environment on students' perseverance and, consequently, on their academic success. They describe this environment as both the classroom atmosphere and the school atmosphere.

The fourth dimension focuses on the teacher's personal qualities, including caring, fairness, enthusiasm and encouragement to take responsibility. These aspects are known to play a major role in student learning (e.g. Noddings 2005, Yeager *et al.* 2019, Smith *et al.* 2022). For example, teachers' behaviour towards and support of student achievement are crucial to their academic success (Maulana *et al.* 2017).

In addition to this dimension, in more recent studies, it has been shown that reflective practice enables teachers to take a critical look at what has happened in the classroom and to consider improvements to the teaching programmes offered to students (Colognesi *et al.* 2021, Ivanova-Armeykova 2020, Tay *et al.* 2022).

Method

As mentioned above, our research is collaborative (Desgagne 1997, Bourassa *et al.* 2007) and thus forms an interprofessional learning community (Vinatier and Morrissette 2015). Working not 'on' the actors, but 'with' the professionals rooted in their field, it

thereby offers an opportunity to reduce the gap between knowledge derived from research and that derived from the field (Dupriez 2015). In addition, we have chosen to adopt a research-development perspective. This type of research 'is mainly oriented towards the action pole; its primary objective is to develop material or conceptual tools useful for acting on a local situation' (Loiselle and Harvey 2007, p. 46, our translation).

Participants

The collaborative group, dubbed GCEO by the group itself, is made up of 16 participants: 5 teacher educators (including one man) from 5 different institutions in French-speaking Belgium (4 teach courses in psychopedagogy, one in first-language didactics), 5 female teachers (three are primary school teachers, two are secondary school teachers), 4 researchers (two junior researchers and two senior researchers, including one man) and, for years 2 and 3 of the project, 2 female students have joined the group (one in teacher training, the other in educational science).

These people participated in the group on a voluntary basis. All meetings took place at times when everyone was free (such as Wednesday afternoons and evenings).

Procedure

Throughout the process, we followed the recommendations of Harvey and Loiselle (2009) to complete the development of our tool. To achieve this goal, the collaborative group worked together for three years, from 2018 to 2021. Each year was dedicated to a specific project objective. At the end of each session, the group decided together on the programme for the next meeting, and the agenda was negotiated collectively.

Year 1 - Definition of objectives, theoretical exploration and emergence of the tool

Six one-day sessions, spread over the academic year, took place during this first year of work. The process began with the inaugural session, designed to kick-start the research. During this first session, group members introduced themselves, and the research project was collectively defined. On this basis, an agenda was drawn up for the work to be carried out.

In line with the principle that research and development is based on the examination of existing theories and previous work (Guichon 2007, p. 46), we began by exploring the theoretical frameworks relevant to the construction of our tool.

First, a collective brainstorming session was organised to identify all the relevant concepts to be considered in the tool. We then attempted to link the emerging notions from the brainstorming to each other. While there was immediate agreement on some concepts (such as pedagogical alignment and formative assessment), others (such as metacognition and perceived task value) gave rise to divergent points of view. To overcome these differences, we divided the concepts among members in pairs, who explored the relevant literature and synthesised their findings in the form of cards that were shared.

In a second phase, a sub-group of 4 members developed a first version of the tool. The key elements identified included objectives, links between courses, content,

didactics, devices, metacognition, learner profile, assessment and reflexivity on practices. In relation to these concepts, actual practices before, during and after the class were pinpointed (e.g. for objectives: define objectives before, tell students during the lesson, update objectives after the activity). This initial version was proposed to the entire collaborative group, which discussed it. Several reworkings emerged, such as the addition of contextual elements, such as strong institutional support and classroom climate, as these were seen as essential to the implementation of these practices. A number of questions remained unanswered at this stage, notably concerning the pedagogical approaches to be favoured.

As a third step in the development of the tool, we drew up a questionnaire for teachers. The aim was to assess the extent to which the practices we had identified were actually important to teachers, and how often they implemented them. Following the collection of responses from 300 teachers in French-speaking Belgium, three Focus Groups were organised to complete the data with teachers at different career stages (for details, see Colognesi *et al.* 2024). The results of this stage were used to revise the tool once again in a group session. Each selected practice was debated and agreed by the participants, resulting in a suitable version of the tool at the end of the year.

This first year of work ended with an evaluation of our process, following the indicators of collaborative research established by Van Nieuwenhoven and Colognesi (2015).

Year 2 - Consolidation and successive validations of the tool

The second year of research was devoted to validating the tool. To this end, several successive steps were taken, each contributing to the refinement of our work.

Firstly, a presentation was made to teacher trainers at a study day. We ran the same workshop twice, with around twenty people each time. In the workshop, our various concept sheets were presented, followed by a 'World Café' activity, where participants selected the concepts they considered relevant and linked them together. The latest version of the tool was also presented. The participants discussed our proposal, writing down their reactions to it, bringing nuances and new elements to the tool. In each workshop, five groups thus discussed each time, bringing us to 10 discussion groups. Traces of the discussions were kept.

Secondly, we used feedback from workshop participants to improve our tool. In particular, we separated the teacher's anticipation (such as thinking about saying the objective) from the action with the students (such as formulating the objective in the students' words so that they understand). This version was then more complete and better interconnected than the previous one.

Thirdly, we invited an academic expert in teaching practices (from a country other than our own). We presented him with the tool as it was, and gathered his reactions and advice. This feedback provided us with new opportunities for improvement, such as accompanying the tool with a sheet that includes different questions to ask around each practice, so that it is not perceived as prescriptive but rather as a guide, providing opportunities for reflection.

Year 3 - Stabilizing the tool and preparing for distribution

The third year was devoted to preparing the tool's distribution. To this end, a number of important decisions were taken, including the co-writing of this article. This article

is the result of collaborative writing and proofreading by all group members. Some meetings and exchanges took place online, due to the COVID-19 period. Collaborative writing tools were used. Several sessions were needed to write the different parts of the text, reread them and rework them. The fact that we had to present the tool in writing meant we had to make a few final adjustments to make it as clear as possible for its recipients, the future teachers. The principal investigator, in his role, compiled the whole and finalised the present text.

Findings

The tool, which we have named Prep.AR, is shown in Figure 1 and described in more detail below. Prep.AR is an acronym that stands for *Prepare Action Reflection*. In French, it can also be heard in the heads of future teachers with the leitmotiv 'Prepare!'.

The tool contains various parts, which we describe in detail below. These parts are part of a whole that considers all planning to be based on three types of knowledge: the context (such as the values of the school, the class, etc.), the classroom environment (the rules that are in force, the habits of the pupils, etc.) and the learners themselves (the prerequisites they should have for the learning object in question, for example, their relationship to this knowledge and their conceptions of it).

It is with this knowledge in mind that the various aspects of planning can be considered. These are of four kinds: (1) the content to be learned, (2) the pedagogical intentions, (3) the tasks to be proposed to students, and (4) the intended consolidation of the learning object. And for each aspect, two types of focus could be envisaged: the planning of a set of practices for teaching, and their enactment for students, what we have called 'planning interaction'. These aspects are presented below.

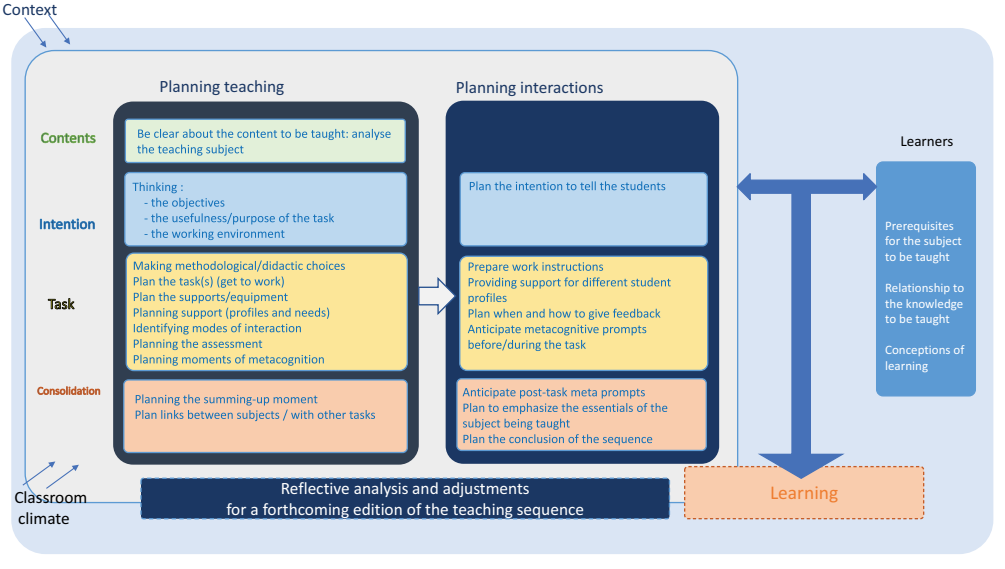

Figure 1. Line guide to planning a teaching/learning activity: the Prep.AR tool.

Plan the content(s) to be learned

Planning a learning sequence should start with clarifying the content to be taught: familiarising with the content to gain a solid understanding of it, including its key elements, main concepts and implications. This is where key questions for the sequence can arise, such as: what are the key points, main features and essential information that students should retain? What are the difficulties of this subject? What's the significance of the learning, why teach it? What other subjects or concepts have the students already studied that may relate to the content being taught?

Planning and translating pedagogical intentions

This stage of the planning process is where the teacher's pedagogical intentions are established. This is because, logically, it's within the first few minutes of the sequence that the students should have this information. It's a question of identifying for yourself as a teacher, but also of translating into the pupils' words: what are the objectives pursued in the sequence; what is the value of this knowledge and of the tasks you're going to propose to learn it; what is the work environment necessary for the activity to run efficiently?

Plan the task(s) assigned to students

This planning stage considers all aspects of the activity that will enable students to achieve their objectives and intentions. There are many aspects to investigate.

Depending on the objectives pursued and the knowledge to be taught, choose an appropriate methodology and didactic approach. Based on this choice, the tasks that will be proposed to the students throughout the sequence are prepared, in line with the didactic approach selected: What will the students do during the sequence? How will we make them cognitively active? When and how will they ask questions? It also means thinking about how to present instructions in the students' own words, so that they can get down to work.

On the basis of these choices, the materials and support can be considered: Are there any existing materials for the sequence? Can technologies be useful?

The support to be offered to students can be planned, addressing a number of questions, such as: How can we help students to achieve what is required of them? What reactions/aids/reminders can be prepared in advance to intervene according to the learner's profile (the one who will find it too complicated, the one who will go faster than the others, the one who will lack one or more strategies to reach the end, etc.)?

The modes of interaction can also be considered: What exchanges will took place with the students during the instruction programme? What questions will be asked? Will they discuss in sub-groups at some point, and on the basis of what instructions?

Assessment is also anticipated at this stage: How are students assessed? When and how can their progress be observed and monitored? When and how should they be given feedback? Will they have the opportunity to assess themselves and their peers?

Metacognitive prompts are also valuable to plan, enabling students to share their difficulties, strategies, etc. with questions before the task, such as asking what goals they are setting themselves, how they are going to proceed, and during the task by inviting them, for example, to share what they are doing and how.

Plan the consolidation of taught learning

At this stage of the planning process, the aim is to bring students to a conclusion and set them to work on a project that will enable them to consolidate their learning to other contexts. This can be done through post-task metacognitive solicitations, such as asking students to say how they went about carrying out the proposed task, what they learned, what they remember as winning strategies for repeating the task, etc. On the basis of the teachers' answers and contributions, a synthesis can be drawn up of what was done and learned (in terms of key content characteristics and strategies), and links can be made with other content, disciplines and tasks. For example, we can consider the contexts in which the content worked on can be envisaged.

In addition, it should be noted that the planning, as envisaged in a first version, could be reworked and rewritten according to what has actually been achieved during the teaching/learning activity, and on the basis of the reflective analysis made by the teacher. This way, if the sequence is offered to the students again, it will have benefited from improvements. This avoids the need to start planning all over again, but rather to improve it over time (with, for example, variants, different approaches to the same content, etc.).

Discussion and conclusion

The complexity of the lesson-planning process for pre-service teachers is underscored by its many challenges. In particular, the challenge of having to integrate practices promoted by training, which are sometimes not those emphasised in the professional field (Waege and Haugaløkken 2013, Flores 2016, Deprit and Van Nieuwenhoven 2018). However, the diversity of these trainers, coming from a variety of contexts and disciplines, can lead to divergent points of view as to what constitutes 'good' pedagogical practice, as well as preferences for a particular approach (Hanin *et al.* 2022). Pre-service teachers then find themselves encouraged to adopt new approaches, while at the same time running the risk of being overwhelmed by their sheer number, breadth, and complexity (Ertmer *et al.* 2012). This is why a consensus is needed among trainers on the practices promoted in training that could be incorporated into lesson planning.

Thus, the collaborative research we undertook was intended to achieve this consensus and facilitate the complex process of lesson planning, a crucial step in the training of pre-service teachers (Panasuk and Todd 2005, Deprit and Van Nieuwenhoven 2021).

The results of our three-year collaborative research have led to the creation of an innovative tool, called Prep.AR. It is summarised in a synthetic figure and is accompanied by a series of questions, which capture the various aspects of lesson planning. Prep.AR is designed to guide future teachers through the various stages of planning, from clarifying the content to be taught to pedagogical intentions, from tasks assigned to

students to the consolidation of learning. Each aspect of planning is enriched by the forecasting of pedagogical practices and their implementation for students, thus encompassing the entire teaching process. It's a guide, in other words, a set of questions that lesson planners can ask themselves as they prepare, rather than a set of rules and regulations that force them to follow.

The complex and multifaceted nature of instructional planning rendered the collaborative research approach we adopted imperative. By integrating the voices and perspectives of pre-service students, field teachers, teacher educators and researchers in the field, we were able to create a tool that emerged directly from classroom realities and training needs. The multiple influences that shape planning, from cultural differences to diverse pedagogical approaches, were taken into account thanks to this collective approach. This collaborative research established a vital bridge between theory and practice (Vescio *et al.* 2008). Moreover, the nature of our development research was particularly appropriate to meet our objective of creating a practical tool adapted to the educational context, taking into account research recommendations (eg., Stronge *et al.* 2011, Ko *et al.* 2014) while ensuring that the tool is usable and relevant for future teachers. The recommendations of Harvey and Loiselle (2009) guided us to follow an iterative process, allowing us to explore and adjust the theoretical concepts, teaching practices and functionalities of the tool. Each year was dedicated to a specific objective, enabling us to build the tool progressively, taking into account feedback from the various players involved (Desgagne 1997, Bourassa *et al.* 2007, Vinatier and Morrissette 2015). This approach also provided us the opportunity to constantly evaluate our collaborative research process, thus ensuring its rigour and quality (Van Nieuwenhoven and Colognesi 2015).

Despite the significant contributions of our study towards the facilitation of lesson planning, our research is not without its limitations. In particular, our collaborative approach, while allowing for a variety of perspectives, may not have covered all the nuances and particularities of all educational contexts (e.g. pre-school, special education, etc.). Furthermore, cultural differences and disciplinary variations could also influence the way the tool is interpreted and applied, requiring careful adaptation in different teaching environments. Another consideration is the fact that some of the group's participants come from the same training institute, which may influence shared frames of reference

Furthermore, our research centred on the tool's co-construction phase, leaving out the stage of practical implementation by future teachers. This gap prevents a full assessment of the tool's actual effectiveness on the quality of planned lessons and student performance. A more comprehensive, longitudinal study could remedy this limitation by examining how the utilisation of the tool translates into practice, while identifying any necessary adjustments

Finally, the development of this tool is only a first step. Its effectiveness and development will continue to depend on real-life experimentation. Two concrete steps are planned for the coming months. Firstly, to share the tool with the training communities of the various institutes involved in the research. The trainers present in the collaborative group will be in charge of this part, so that they can share with their peers the tool they have built (which they have already validated in part

through the study day where they were able to give their point of view, so they are waiting for that). Secondly, to disseminate the tool to student teachers and suggest that they use it. This brings us to the prospects for future research: exploring how future teachers adopt the tool and the impact of its use on the quality of planned lessons.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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