

THE ESSENCE AND SPECIFIC FEATURES OF THE PROCESS OF DEVELOPING REFLECTIVE COMPETENCE THROUGH DIGITAL TECHNOLOGIES

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АННОТАЦИЯ:

This article examines the essence and specific features of the process of developing reflective competence by means of digital technologies. Drawing on classical theories of reflection and on empirical studies of video analysis, blogs, electronic portfolios, and online discussion, the article conceptualizes reflective competence as a multicomponent professional capability and describes its technology-mediated development as a purposeful, scaffolded, and socially supported cycle of capturing, interpreting, discussing, and re-planning practice. Six distinctive features of this process are identified, a six-stage pedagogical model is proposed, and the main conditions and risks of implementation are discussed. The study is a theoretical, literature-based analysis; the proposed model requires empirical validation.

1.Introduction

Professional education increasingly aims to prepare specialists who can learn from their own practice rather than merely apply ready-made procedures. In teacher education, this aim is usually expressed through the concept of the reflective practitioner (Schön, 1983), and reflection is widely regarded as a core component of professional competence (Korthagen et al., 2001; Moon, 2004). A teacher who can systematically examine personal decisions, test assumptions against evidence, and adjust practice accordingly is better prepared for the uncertainty and complexity of the classroom than one who relies on routines.

At the same time, digital technologies have changed the conditions under which professional learning takes place. Lessons can be recorded and replayed, reflections can be written, shared, and commented on in online environments, and evidence of professional growth can be accumulated in electronic portfolios. The European Framework for the Digital Competence of Educators explicitly includes reflective practice and digital continuous professional development among the competences of professional engagement (Redecker,

2017). In Uzbekistan, national legislative and strategic documents encourage the digitalization of education, including the Law on Education (Republic of Uzbekistan, 2020a) and the Digital Uzbekistan–2030 Strategy (Republic of Uzbekistan, 2020b), which makes the question of how digital tools can serve professional development especially relevant.

Despite this interest, the process of developing reflective competence through digital technologies remains insufficiently theorized. In practice, technology is often treated as a neutral container for traditional reflective tasks, for instance, when a paper diary is simply replaced by an online one. Such an approach overlooks the fact that digital tools change how experience is captured, who can see it, how long it persists, and what kinds of dialogue it makes possible.

The aim of this article is to clarify the essence of the process of developing reflective competence by means of digital technologies and to identify its specific features.

2.Literature review

2.1. Reflection and reflective competence, conceptual foundations

Dewey (1933) defined reflective thinking as the active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds that support it and the conclusions to which it leads. He also stressed that reflection depends on attitudes (open-mindedness, responsibility, and wholeheartedness) and not only on intellectual skill. Rodgers (2002), reinterpreting Dewey, describes reflection as a systematic, disciplined meaning-making process that moves learners from one experience to a deeper understanding of it and that is best carried out in interaction with others.

Schön (1983) distinguished reflection-in-action, which occurs while a professional is acting, from reflection-on-action, which takes place afterwards. Digital technologies are most obviously helpful for the second type, because they preserve traces of action that can be revisited. Boud, Keogh, and Walker (1985) described reflection on experience as returning to the experience, attending to feelings, and re-evaluating the experience, while Kolb (1984) placed reflective observation within a cycle that links concrete experience, abstract conceptualization, and active experimentation. Korthagen et al. (2001) operationalized this logic for teacher education in the ALACT model, whose phases are action, looking back on the action, awareness of essential aspects, creating alternative methods of action, and trial.

Reflection is not uniform in quality. Hatton and Smith (1995) distinguished descriptive writing, descriptive reflection, dialogic reflection, and critical reflection. Kember et al. (2008) proposed a four-category scheme ranging from habitual action (non-reflection), through understanding and reflection, to critical reflection. Critical reflection is close to what Mezirow (1991) called premise reflection, that is, questioning the assumptions that underlie one's beliefs and actions. These taxonomies matter for the present topic because they provide criteria for judging whether digital activities actually deepen reflection or merely generate text.

2.2. Reflective competence as an integrated professional capacity

Although reflection and reflective competence are closely related, they should not be treated as identical concepts. Reflection can be regarded as a process of examining experience, whereas reflective competence represents a more stable professional capacity to perform such reflection purposefully and effectively. On this basis, reflective competence can be defined as: an integrated professional capacity that enables a future teacher to consciously analyse pedagogical experience, evaluate professional decisions and their consequences, identify strengths and difficulties, use evidence and feedback, formulate alternative strategies, and plan further professional development.

This definition indicates that reflective competence includes several interconnected components.

➤ *Motivational-value component.*

This component reflects the future teacher's awareness of the importance of self-development, professional responsibility, and willingness to examine one's own pedagogical activity.

➤ *Cognitive component*

This component includes knowledge about reflection, pedagogical theories, teaching methods, assessment principles, professional standards, and digital tools that support reflective learning.

➤ *Practical-operational component*

This component represents the ability to apply reflective strategies in authentic professional situations.

➤ *Analytical-evaluative component*

This component involves the analysis of professional actions, evidence, learner responses, feedback, and outcomes.

➤ *Developmental-prognostic component*

This component concerns the ability to formulate professional goals and determine concrete actions for subsequent improvement.

Therefore, reflective competence should be understood as a multidimensional construct rather than simply the ability to write a reflective essay.

3. Methodology

3.1. The essence of the process

Digital technologies do not create reflection; they re-mediate it. In the proposed understanding, the essence of the process of developing reflective competence by means of digital technologies is a purposeful, pedagogically organized activity in which digital tools are used (a) to capture and externalize professional experience, (b) to support its structured analysis and interpretation, (c) to open it to dialogue with peers, mentors, and theory, and (d) to convert the resulting insights into documented changes in practice, so that reflection gradually becomes an internalized professional habit.

Two aspects of this definition deserve emphasis. First, the process is developmental: its goal is not a single successful reflective task but a lasting change in the way students think about their practice. Second, the process is pedagogical rather than technological: the same tool may produce either superficial description or critical analysis, depending on how the task is designed, supported, and assessed.

It is useful to distinguish two dimensions of the process. In the first, digital tools serve as a medium of reflection (reflection with technology): recordings, blogs, portfolios, and discussion forums are used to reflect on any aspect of teaching. In the second, digital technologies themselves become the object of reflection (reflection about technology): students examine why, when, and how they use digital tools in teaching. The second dimension is closely connected with the TPACK framework, which describes teacher knowledge as the interplay of technological, pedagogical, and content knowledge (Mishra & Koehler, 2006). Research on teachers' technology use also shows that beliefs and confidence strongly influence how technology is used in classrooms (Ertmer & Ottenbreit-Leftwich, 2010), which suggests that reflection on one's own beliefs about technology is a necessary part of developing digital competence. The two dimensions may therefore reinforce each other.

Socio-cultural theories explain why the process has a social side. Wenger (1998) argues that learning is largely a matter of participation in communities of practice, and Garrison, Anderson, and Archer (2000) show in their Community of Inquiry framework that online learning depends on the interplay of cognitive, social, and teaching presence. For reflective competence, this means that digital environments should be designed not only as private notebooks but also as spaces for shared inquiry.

3.2. Digital tools and their reflective affordances

Research has examined several groups of digital tools in connection with reflection. Table 1 summarizes their main reflective functions.

Table 1.

Digital tools and their reflective functions

Digital tool	Reflective function
Video recording and annotation	Makes classroom events repeatedly observable; helps shift attention from evaluation to interpretation
Blogs and online journals	Support written reflection, scaffolded prompts, and peer feedback
Electronic portfolios	Accumulate evidence and reflective commentary over time and make growth visible

Digital tool	Reflective function
Online discussion and conferencing	Enable asynchronous dialogue, questioning, and joint interpretation
Digital competence self-assessment	Diagnoses the starting level and informs individual development plans

Video is perhaps the most thoroughly studied tool. In a video-club study, Sherin and van Es (2009) reported that participating teachers learned to notice and interpret student thinking more closely and moved from evaluating events toward interpreting them. Tripp and Rich (2012) found that teachers who analyzed recordings of their own lessons identified aspects of their practice that they had not noticed before, and they highlighted the role of feedback from colleagues and explicit goal-setting in subsequent change. Calandra et al. (2009) reported that editing video of their own teaching encouraged novice teachers to focus on specific aspects of practice.

Blogs and online journals have been used to support written reflection. Yang (2009) found that blogging combined with peer feedback supported critical reflection among pre-service teachers. Wopereis et al. (2010) examined weblogs as instruments for reflection on action and pointed to the importance of task design and support. Lai and Calandra (2010) found that computer-based scaffolds improved the quality of novice teachers' reflective journals. Barrett (2007) emphasized that reflection on artifacts, rather than their mere collection, gives electronic portfolios their learning value. Finally, online conferencing allows asynchronous dialogue in which participants question and build on each other's interpretations (Garrison et al., 2000).

The analysis of the sources makes it possible to identify six specific features that distinguish technology-mediated development of reflective competence from its traditional counterpart.

1. Externalization and re-visitability of practice. Recordings and digital artifacts replace memory with evidence. Because an event can be replayed, students can examine details that were invisible during the lesson and compare their recollection with what actually happened. This supports a shift from reflection-in-action, which is limited by time pressure, toward more careful reflection-on-action (Schön, 1983) and helps develop what Sherin and van Es (2009) call professional vision, that is, the ability to notice and interpret significant classroom events.

2. Dual orientation: reflection with and about technology. As noted above, digital tools serve both as a medium and as an object of reflection. This allows the development of reflective competence to be integrated with the development of digital competence in line with the TPACK framework (Mishra & Koehler, 2006).

3. Scaffolded structure. Open instructions such as "write a reflection" often yield descriptive accounts. Digital environments make it easy to embed prompts, templates, rubrics,

and sequenced tasks that guide students toward deeper levels of reflection. Lai and Calandra (2010) found benefits of such scaffolds, and Ryan (2013) argues that reflection must be explicitly taught, modeled, and assessed rather than simply requested. Rubrics based on the levels proposed by Hatton and Smith (1995) or Kember et al. (2008) allow students and instructors to see what progress looks like.

4. Social and dialogic character. Digital spaces make reflections visible to peers and mentors, which turns an individual activity into a shared inquiry. Peer comments, mentor feedback, and group annotation of video introduce alternative interpretations and challenge unexamined assumptions, which is essential for moving from descriptive to dialogic and critical reflection (Garrison et al., 2000; Hatton & Smith, 1995; Yang, 2009). At the same time, visibility requires a climate of trust.

5. Cumulative and longitudinal documentation. Portfolios, blog archives, and version histories preserve reflections over time, allowing students to compare earlier and later entries and to see their own development (Barrett, 2007). This supports self-regulated learning, in which forethought, performance monitoring, and self-reflection form a cycle (Zimmerman, 2002), and it gives instructors a basis for formative assessment. Asynchronous access also lets students reflect at a pace and time that suit them.

6. Multimodality and personalization. Digital tools allow reflection to be expressed in text, audio, video, images, and annotated timelines, and allow students to choose the form that best expresses their thinking. Self-assessment instruments aligned with DigCompEdu (Redecker, 2017) make it possible to individualize both the starting point and the development plan. Multimodality may make reflection more accessible to students who find extended writing difficult, although this assumption requires further empirical study.

Drawing on the ALACT model (Korthagen et al., 2001), Kolb's cycle (1984), and the features described above, a six-stage model is proposed (Table 2).

Table 2.

A staged model for developing reflective competence by means of digital technologies

Stage	Activities and digital tools	Expected outcome
1. Diagnosis and orientation	Self-assessment of digital and reflective competence (e.g., a DigCompEdu-based questionnaire); introduction to the levels of reflection and assessment criteria	Individual development map; shared understanding of expectations
2. Capturing practice	Recording micro-teaching or practicum lessons; collecting artifacts in an e-portfolio; short written or audio notes	Externalized experience available for analysis

Stage	Activities and digital tools	Expected outcome
3.Guided analysis	Structured prompts, rubrics, and video annotation; reflection on technology choices using TPACK	Movement from description to analysis of essential aspects
4. Dialogue	Peer and mentor comments in forums or shared documents; group discussion of video excerpts	Alternative interpretations; dialogic and critical reflection
5.Re-planning and trial	Setting specific goals; revising lesson plans; teaching and recording again	Alternative actions tested in practice
6.Documentation and evaluation	Portfolio synthesis; rubric-based assessment; self-evaluation of progress	Evidence of developed reflective competence

The literature suggests several conditions that influence the effectiveness of such a model:

- explicit instruction in, and modeling of, reflection by instructors (Ryan, 2013);
- a psychologically safe climate for sharing recordings and reflections;
- timely and specific feedback from mentors and peers (Tripp & Rich, 2012);
- integration of the activities into the curriculum and teaching practicum rather than treating them as an additional task;

• criteria-based assessment that uses levels of reflection (Hatton & Smith, 1995; Kember et al., 2008); and a sufficient baseline of digital skills, together with clear rules on consent and data protection for recordings.

A digital reflective diary can be used as a systematic instrument for recording and analyzing professional experiences. A structured digital diary may follow this sequence: Situation → Action → Result → Analysis → Alternative → Lesson learned → Future action. This structure encourages future teachers to move beyond simple description. For example, instead of writing: "The students were not active during the lesson."

The reflective process should encourage the student to investigate:

- Why were the students not active?
- Was the task appropriate for their level?
- Were the instructions sufficiently clear?
- What evidence indicates low engagement?
- What alternative strategy could be used?
- What will be changed in the next lesson?

Such questions transform digital writing into professional inquiry. *Electronic portfolios* Electronic portfolios are particularly relevant because they combine documentation,

reflection, assessment, and professional development. A future teacher's e-portfolio may contain:

lesson plans;

- teaching materials;
- presentations;
- student work;
- assessment results;
- classroom video;
- mentor feedback;
- peer feedback;
- reflective essays;
- professional goals;
- evidence of competence development.

Recent research published in Education and Information Technologies examined e-portfolios among preservice teachers and reported their potential for supporting reflection, professional identity, authentic assessment, and digital preparedness. The study used reflective portfolio activities and investigated students' experiences during and after teacher preparation.

Therefore, the e-portfolio should not be treated merely as a digital archive. Its pedagogical value emerges when learners critically select evidence, interpret it, evaluate their development, and plan future actions.

Video-based reflection

Video recording provides a unique opportunity for future teachers to observe their own teaching from an external perspective. A video-reflection activity can focus on:

- teacher-student interaction;
- questioning techniques;
- teacher talk time;
- learner participation;
- classroom management;
- instructional explanations;
- feedback;
- use of digital resources;
- differentiation.

However, video recording alone does not guarantee deep reflection. Research on video reflection in teacher preparation stresses the importance of a clear definition of reflection and appropriate instructional support.

Therefore, video analysis should be accompanied by a rubric or reflective questions. Online interaction and peer feedback

Digital technologies create opportunities for social reflection. Future teachers can share a

pedagogical problem through an online forum and receive alternative interpretations from peers. They can compare their own analysis with the perspectives of classmates, mentors, and university teachers. This process is important because reflection can be strengthened through dialogue. A student may initially interpret a classroom problem as a learner motivation issue, while peer feedback may reveal that unclear instructions or inappropriate task design contributed to the problem. Thus, online interaction can broaden professional perception and support critical reflection.

Conclusion

The analysis leads to the following conclusions:

1. Reflective competence is a multicomponent professional capability that includes cognitive-analytical, attitudinal-motivational, metacognitive, dialogic, and action-oriented components.
2. The essence of its development by means of digital technologies lies in the purposeful pedagogical use of digital tools to capture, analyze, discuss, and re-plan practice so that reflection becomes an internalized habit.
3. The process is characterized by six specific features: externalization and re-visitability of practice, dual orientation toward technology, scaffolded structure, social and dialogic character, cumulative documentation, and multimodality with personalization.
4. A six-stage model (diagnosis, capturing, guided analysis, dialogue, re-planning and trial, and documentation and evaluation) can organize this process, provided that reflection is explicitly taught, feedback is timely, the climate is safe, and assessment is criteria-based.

The main limitation of this study is that it is a narrative review and that the proposed model has not been tested empirically. Future research should examine the model in quasi-experimental studies, use established coding schemes such as that of Kember et al. (2008) to measure changes in the depth of reflection, and investigate the specific context of teacher education in Uzbekistan. The role of emerging tools, including generative artificial intelligence, in supporting or undermining reflection also deserves systematic investigation.

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