Teachers' use of competency-based assessment in personalised learning practices: An exploratory study[1]

El uso de la evaluación competencial por parte del profesorado en Prácticas de Personalización del Aprendizaje: un estudio exploratorio

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Abstract:
The impact of competencies within the framework of the new learning ecology has generated a qualitative leap in the quality of educational practices. Currently, we have appropriated different personalised pedagogical approaches and innovative methodologies that promote the acquisition and use of competencies, but how do we assess them? Their assessment is not sufficiently clear since there is no consensus on what competencies, competency-based learning, competency-based assessment, among others, mean, which in

Resumen:
El impacto de las competencias en el marco de la nueva ecología del aprendizaje ha generado un salto cualitativo en la calidad de las prácticas educativas. Actualmente, nos hemos apropiado de diferentes enfoques pedagógicos personalizados y metodologías innovadoras que promueven la adquisición y el uso de competencias, pero ¿cómo las evaluamos? Su evaluación no es lo suficientemente clara, puesto que no existe consenso sobre lo que significan las competencias, el aprendizaje basado en competencias, la evaluación competencial, entre otros, lo

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practice presents difficulties and concerns for teachers. This qualitative exploratory study has two objectives: i) to propose a model to analyse competency-based assessment in personalised learning practices and (ii) to illustrate its application to two practices in secondary education. The results show differences in the complexity of competency-based assessment practices, in the degree of relevance of the proposed assessment contexts, and in learners' participation in the feedback process. It is concluded that the model is a potentially helpful tool to understand and optimise competency-based assessment in personalised learning practices. Recommendations are formulated so that teachers can promote effective assessment practices from a competency perspective.

Key words:
competencies; competency-based assessment; personalised learning practices; competency dimension; temporal dimension.

que en la práctica presenta dificultades y preocupaciones para el profesorado. Este estudio cualitativo exploratorio tiene dos objetivos: 1) proponer un modelo para analizar la evaluación competencial en prácticas de personalización del aprendizaje y 2) ilustrar su aplicación a dos de estas prácticas en educación secundaria. Los resultados muestran diferencias en la complejidad que presentan las prácticas de evaluación competencial, en el grado de relevancia de los contextos de evaluación propuestos y en la participación del alumnado en el proceso de feedback. Se concluye que el modelo es una herramienta potencialmente útil para comprender y optimizar la evaluación competencial en prácticas de personalización del aprendizaje. Se formulan recomendaciones para que el profesorado pueda promover prácticas de evaluación efectivas desde una perspectiva competencial.

Palabras clave:
competencias; evaluación competencial; prácticas de personalización del aprendizaje; dimensión competencial; dimensión temporal.

Résumé:
L'impact des compétences dans le cadre de la nouvelle écologie de l'apprentissage a généré un saut qualitatif dans la qualité des pratiques éducatives. Actuellement, nous nous sommes appropriés différentes approches pédagogiques personnalisées et méthodologies innovantes qui favorisent l'acquisition et l'utilisation de compétences, mais comment les évaluer ? Son évaluation n'est pas assez claire, car il n'y a pas de consensus sur ce que signifient les compétences, l'apprentissage basé sur les compétences, l'évaluation des compétences, entre autres, ce qui présente en pratique des difficultés et des inquiétudes pour les enseignants. Cette étude qualitative exploratoire a deux objectifs: i) proposer un modèle pour analyser l'évaluation des compétences dans les pratiques de personnalisation des apprentissages et (ii) illustrer son application à deux de ces pratiques dans l'enseignement secondaire. Les résultats montrent des différences dans la complexité des pratiques d'évaluation des compétences, dans le degré de pertinence des contextes d'évaluation proposés et dans la participation des étudiants au processus de feedback. Nous concluons que le modèle est un outil potentiellement utile pour comprendre et optimiser l'évaluation des compétences dans les pratiques de personnalisation de l'apprentissage. Des recommandations sont formulées afin que les enseignants puissent promouvoir des pratiques d'évaluation efficaces du point de vue des compétences.

Mots clés:
compétences; évaluation des compétences; apprendre les pratiques de personnalisation; dimension compétence; dimension temporelle.

1. Introduction

There is a significant tendency to propose competency-based approaches in teaching, learning and assessment to solve the challenging demands of today's society. In this direction, for example, there exist proposals to foster personalised contexts that offer a variety of strategies aimed at learners make sense and personal value of learning and can perform autonomously in diverse sociocultural contexts (Bray & McClaskey, 2015, 2017; DeMink-Cathew et al., 2020; Martín & Coll, 2023). However, competency-based assessment is not precise enough, on the one hand, because there is no unified perspective on what competencies mean and, on the other hand, due to the difficulties derived from teachers' conceptions of competency-based assessment, feedback, and poor literacy in these areas (Cano et al., 2023; Chan & Luo, 2020; Nieminen & Carless, 2023). This work presents a competency-based assessment model, developed from a sociocultural constructivist perspective, which arises from the need to understand the complexity of competency-based assessment in personalised learning practices.

1.1. Competency-based Assessment in Personalised Learning

Currently, educational assessment has been designed to assess competencies. This is due to competencies have come to occupy a prominent place on the political, economic, educational, and social agenda in recent years and are considered as a fundamental pillar of the development and curricular renewal of educational systems and pedagogical innovations as a basic unit of lifelong learning (European Commission, 2019; OECD, 2019; UNESCO, 2020). From a socioconstructivist perspective, competency-based assessment implies to assess learners' performances in real life contexts (Joannert, 2019; Martín & Coll, 2023; Perrenoud, 2012). These performances require to carry out highly complex competences that include relevant characteristics. Firstly, competence is contextual; that is, it is linked to different authentic activity contexts where people participate, learn, and obtain help for their development (Hou, 2022; Joannert, 2019; Membrive et al., 2022; Oller et al., 2024). Secondly, it is integral and functional since it requires internal resources and knowledge (knowledge, abilities, skills, attitudes, emotions, etc.) and external ones (materials, technical and symbolic artefacts, help from

others) that the learner must be able to activate and apply not only in situations of a specific field, but also in other contexts of social and cultural activity where new learning can be carried out (Coll, 2009). Thirdly, it implies complexity since it is associated with specific assessment criteria and performance standards.

One of the most recent curricular proposals aimed at developing competencies is personalised learning. Personalised learning implies a competency-based learning approach that places the learner at the centre of educational action (Bernacki et al., 2021; Bray & McClaskey, 2015; Coll & Engel, 2023; Schmid et al., 2022). Personalised learning promotes active methodologies by involving learners in experiential activities where they can do, act and experience real learning experiences (Darling-Hammond et al., 2020; Hou, 2022; Ye-Lin et al., 2019). In this regard, personalised learning facilitates competency-based assessment since allows assessing competencies in diverse contexts –in and out of formal educational centres– in connection with learners' interests, experiences, expectations and needs (Giménez Beut et al., 2021; Solari et al., 2023) and integrate diverse and functional resources and knowledge. Along personalised learning practices learners can take control of their learning process, which involves making decisions on their learning (DeMink-Carthew & Netcoh, 2019; FitzGerald et al., 2018) and making self-judgements on their assessment process (Tai et al., 2018), reflecting individually and collectively on their learning experiences so that they can construct a representation of themselves as competent learners through teachers' support and feedback (Chan & Lee, 2021; DeMink-Carthew et al., 2020). What makes competency-based assessment effective in personalised learning practices is not only the contextual and functional aspects mentioned before, but also the guided support and constructive feedback so that learners can act in a more autonomous and self-regulated manner (Carless & Winstone, 2020; Esterhazy et al., 2021).

1.2. A Model to analyse Competency-based Assessment in Personalised Learning

Based on a sociocultural constructivist theory, we propose a model that allows us to identify, understand, and analyse competency-based assessment in personalised learning practices. The model must comprise

two dimensions: (1) competency dimension and (2) temporal dimension. The elements that configure the dimensions are the result of the review and synthesis of the contributions of several authors about the assessment processes. The elements of each dimension are detailed in depth below (see Figure 1).

Figure 1
A Model to analyse Competency-based Assessment in Personalised Learning Practices
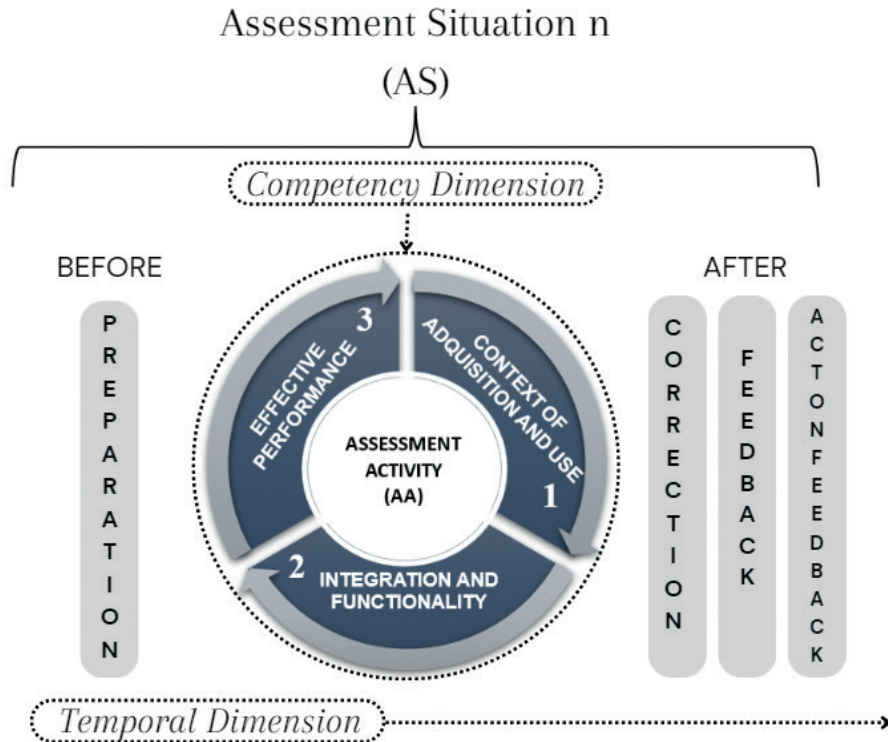
Note: n = Undetermined number of assessment situations in a personalised learning practice

The competency dimension includes the three key elements that an assessment activity (AA) must present: (1) the context of acquisition and use of competencies; this context must be authentic in at least two senses. In the first sense, it must have personal relevance; it must be linked to learners' interests, their capacity to make decisions, their learning objectives, expectations, and needs (Solari et al., 2023). In a second sense,

it must have social relevance. It is also necessary to be linked to the demands of sociocultural contexts since what determines an effective performance depends strongly on the context and how relevant it is for the learner on a personal and social level. In this regard, an authentic assessment requires real situations or problems (Brown, 2018; Darling-Hammond et al., 2020), (2) the integration and functionality of diverse resources and knowledge. That is, learners must be capable of mobilising different resources and knowledge in an articulated and interrelated manner to face specific situations in authentic contexts of activity (Coll, 2009; Perrenoud, 2012), and (3) the importance of effective performance that is, involving complex autonomous actions recognised by multiple agents (Bouwer et al., 2023) linked to practical and experiential activities (Colby, 2019; Levine & Patrick, 2019).

The temporal dimension considers assessment moments before and after an assessment activity where the teacher progressively gives control to the learners so that they actively participate in their learning process to support learners' sense-making (Bray & McClaskey, 2015, 2017; Coll et al., 2012; Darling-Hammond et al., 2020). The temporal dimension considers two levels:

(1) The first level is aimed at identifying how the set of assessment situations (AS) are organised and distributed throughout the personalised learning practice and,

(2) The second level aims to analyse the complexity presented by the moments before and after the assessment activities (AA).

Level 1 offers a global overview of the distribution of the set of assessment situations conducted throughout the practice and of the complexity and relationships they present. Level 2 allows to identify the different moments of assessment. Especifically, in the preparation of the assessment activity, the degree of transparency (Balloo et al., 2018); whether the teacher offers opportunities to involve all learners in the clarification or co-design of the assessment criteria and performance standards (Bray & McClaskey, 2017; Fraile et al., 2017). After the assessment activity, the model proposes to identify whether in the correction the criteria have been used, especially through self-assessment and pair assessment, which are crucial for the development of self-regulation (Balloo et al., 2018; Chen & Bonner, 2019). The model allows to identify whether there exists a formative and dialogic feedback, and furthermore,

whether the teacher offers opportunities for productive feedback, making the learner take an active role as a judge of their learning process (Esterhazy et al., 2021; Mandouit & Hattie, 2023), having been necessary a feedback literacy (Nieminen & Carless, 2023). The last moment of the model involves the learner acting on feedback. Specifically, they can make decisions to improve their learning in current and future contexts. The effectiveness of feedback for decision-making will depend on curricular and instructional designs and strategies that promote the development of reflective and critical skills in the learner (Carless & Winstone, 2020; Coppens et al., 2023).

In this context, this study has two main objectives. The first is to present a model to analyse personalised learning practices. This tool is intended for educational researchers and professionals since it can be used to analyse competency-based assessment in educational practices and reflection on one's teaching praxis. The second objective is to illustrate the application of the model by analysing the competency-based assessment in two personalised learning practices in secondary education to understand to what extent the potential of the tool provides concrete examples of each of the analysis elements that can support competency-based assessment.

2. Method

This study was carried out as part of a larger research project whose purpose was to explore, analyse, and systematise personalised learning practices that promote students' engagement. Within this framework, a qualitative methodological design is adopted to address the objectives proposed (Willig, 2013). Specifically, an exploratory multiple case study was carried out (Yin, 2018), where each case corresponded to a personalised learning practice focusing on competency-based assessment. In accordance with the methodological approach of the study, the researchers did not control the variables: their participation was limited to designing the instruments used to collect the data and obtaining authorization from the participants (teachers and students) before recording data. Given the exploratory nature of the study, the approach adopted was descriptive and interpretive (Willig, 2013).

2.1. Participants and Setting

Two personalised learning practices were selected in a secondary educational centre in Barcelona, Spain with a highly innovative tradition for 13 weeks in 2019. According to Yin (2018), considering more than one case offers more convincing and contrasted information and allows a better comprehension of the phenomenon of study. Both cases correspond to the Research, Creation, and Service Projects using LBP (Learning-based Project) methodology in which secondary students can choose among different learning areas. The competencies that must be developed and assessed in all projects are C1. Conceptual domain, C2. Information processing, C3. Use of devices and applications, C4. Learn to learn and C5. Teamwork. Students use a learning portfolio to save their activities and reflections on the process. The practices selected are described below and will be used to illustrate the application of the model.

2.1.1. CASE ONE

Case 1 corresponds to the Literary Creation Project (23 sessions/36 hours) in Year 10, including one teacher, and 20 learners (15-16 years old; two men, 18 women). The challenge is to create a literary script (final product) made by and for adolescents that deals with issues linked to their interests. The demand for the script has a connection with the youth theatre room, a neighbourhood entity whose director is the one who makes the demand and actively participates in some sessions, first, guiding a visit to the theatre and, second, assessing and making suggestions to improve the script. The social organisation of the activities is varied: individually, in small groups or the whole class.

2.1.2. CASE TWO

Case 2 corresponds to the Technological Applications Project (18 sessions/30 hours) in Year 10, including one teacher and 20 learners (15-16 years old; 15 men, five women). The challenge is, on the one hand, to implement solutions to improve the environmental parameters detected by learners in the institute (CO_2, lighting, temperature, and humidity) and, on the other hand, to design a 3D box to store the environmental measurement sensors (final product). The teacher demands the product. The project connects with an external bioconstruction entity, offering

students a practical lighting workshop. Most of the activities are done in groups according to the topics of interest (robotics, environmental measurements, and 3D design), others in pairs, and a single activity individually.

3. Procedure and Instruments of data collection

Before collecting the data, this study obtained ethical approval from The Bioethical Committee of the University of Barcelona (IRB00003099). An informed consent process was conducted including the details of the research and information regarding the implications and rights of the participants. Once all participants provided written informed consent, data was collected from the two cases over 13 weeks through participant observation technique, assuming the role of observer of the competency-based assessment in personalised learning practices in a systematic and non-intrusive way. This technique allows us to advance the discourses that are embodied and concretized in practices and strategies, increasing the possibility of perceiving the phenomenon as it develops (Willig, 2013). Narrative records were collected in all classroom sessions, which allow a more complete view of the context and interactions between teachers and students around competency-based assessment. The narrative records allowed us to collect information about the interaction between teachers and students around an activity or content as it happened, preserve the chronological order, avoid observer bias and favor the inclusion of detailed and reliable descriptive elements (Willig, 2013). This information was dumped into an Excel database. In order to complement this information, audio, photographic records, and documentary evidence –students' productions and teacher's rubrics and forms– were included.

4. Procedure and Instruments of data analysis

A descriptive-experiential thematic analysis (Willig, 2013) was applied to the set of narrative records of the practices with the support of audio and photographic records and documentary evidence of all sessions, to complement and give greater contextual clarity and carry out a more de-

tailed analysis of data. Regarding the competency-based assessment model (See Figure 1), three tables were designed that integrate the dimensions, categories and indicators to identify and analyse the assessment situations (see Table 1), the assessment activities (see Table 2) and the assessment moments before and after them (see Table 3). The analysis was carried out in three successive phases. To guarantee the reliability of the data analysis, three researchers participated in the categorization and coding process, using interjudge techniques. The discrepancies and convergence of perspectives were useful for specifying the criteria and ensured greater credibility of the process for their actionable identification (Campbell et al., 2020).

In phase 1 the analysis focused on identifying when and how assessment situations (AS) are temporally distributed throughout the personalised learning practice using the indicators shown in Table 1. The findings obtained from two cases are graphically represented from a global perspective (See Figure 2 and Figure 3).

Table 1

Indicators of the Elements of an Assessment Situation (AS)

Total number of AS	Sn	Undetermined number of sessions in a personalised learning practice	
Each AS		Elements	Elements
	P	Preparation	Clarification or co-creation of assessment criteria and standards.
	AA	Assessment Activity	Process evidence (performance, product, service, etc.).
	C	Correction	Self-assessment, Pair assessment and/or hetero assessment.
	F	Feedback	Formative and dialogic process (bidirectional).
	AF	Act on feedback	Opportunities for dialogue on feedback comments and decision-making by students.

Phase 2 focused on analysing the most relevant assessment activities (AA) during the personalised learning practices. Firstly, we selected the AA according with two criteria:

(i) AA that represents having acquired and used all the competencies throughout the teaching and learning process. Normally, the most relevant AA is the final product of the project (performance, product, service, etc.).

(ii) AA that represents greater complexity from the point of view of the assessment moments: preparation (P), correction (C), feedback (F), and act on the feedback (AF).

Secondly, the selected AA is analysed using the indicators of the competency dimension shown in Table 2. It was also developed some criteria to decide the degree of potential and weight of the elements of the model dimensions based on each of the different analysis indicators. For this, three degrees of potential were differentiated: High Potential (HP↑), Low Potential (LP↓) and No Potential (NP-).

Table 2

Indicators of the Elements of the Competency Dimension in an Assessment Activity (AA)

Competency Dimension	Elements (Key characteristics)	Indicators
Assessment Activity (AA)	Context of acquisition and use of competencies	HP↑: High personal and social relevance of AA (connection with the learners' interests, needs, voice, and community environment). LP↓: Low personal and social relevance of AA (occasional connection with the learners' interests, needs and voice, as well as with their community environment). NP-: Without personal and social relevance of AA.
	Integration and functionality of diverse resources and knowledge	HP↑: High integration and mobilisation of resources and knowledge (interrelation, activation and use of diverse resources and knowledge to face a real situation or problem). LP↓: Low integration and mobilisation of resources and knowledge (occasional interrelation, activation and use of diverse resources and knowledge to face a real situation or problem). NP-: Without integration and mobilisation of resources and knowledge (no interrelation, activation and use of diverse resources and knowledge to face a real situation or problem).
	Effective performance	HP↑: High autonomy, complexity (linked to high standards), and recognition by multiple agents (assessment judgements by pairs, family, etc.). LP↓: Low autonomy, complexity, and recognition of AA by other agents (assessment judgements by pairs, family, etc.). NP-: Non-challenging activities not recognized by other agents.

Phase 3 focused on analysing the moments before (preparation) and after (correction, feedback, and acting on the feedback) the assessment activities (AA) selected, using the indicators of the temporal dimension and their corresponding degree of potential (High Potential (HP↑), Low Potential (LP↓) and No Potential (NP-) shown in Table 3.

Table 3

Indicators of the Elements of the Temporal Dimension (moments before and after an AA)

Temporal Dimension	Elements (Assessment Moments)	Indicators
Before	Preparation	HP↑: High participation of learners in dialogue or joint design of the assessment criteria and standards. LP↓: Low participation of learners in dialogue or joint design of assessment criteria and standards. The teacher only shows or reads the criteria. NP-: No participation of learners. The assessment criteria and standards are designed or applied only by the teacher.
After	Correction	HP↑: High participation of learners in correcting AA (through self-assessment, pair assessment and hetero assessment by other internal or external agents (other teachers or professionals, families, social entities). LP↓: Little participation of learners or other agents in correcting AA. NP-: AA is corrected only by the teacher.
	Feedback	HP↑: Feedback as a formative and dialogic process (bidirectional): continuous support and follow-up to improve ongoing and upcoming learning experiences through dialogue, reflection, and judgments by learners about the information provided by the teacher aligned to the assessment criteria and standards. LP↓: Feedback as delivery of information (unidirectional): focused on information transmission: not detailed or constructive comments aligned to assessment criteria and standards. Do not help to improve or connect with ongoing and upcoming learning activities. NP-: No feedback is evident.
	Act on feedback	HP↑: Opportunities for dialogue on feedback comments and decision-making by learners to improve AA beyond a specific activity. LP↓: Scarce dialogue on feedback comments and decision-making by learners to improve a determined AA. NP-: There is no evidence of dialogue and decision-making by the learner to improve AA.

5. Findings

To answer the research objectives that guide this study, findings derived from the analysis of the data collected are shown below.

5.1. Analysis Findings of Case 1: Literary Creation

Firstly, a temporal sequence illustrates how the AS are incorporated and distributed along the personalised learning practice (see Figure 2). Secondly, it details the extent to which the three key characteristics of competency-based assessment are presented in the AA corresponding to the literary script (s19). Thirdly, it is verified whether actions existed before and after the AA.

5.1.1. Temporal Distribution of Assessment Situations in a Personalised Learning Practice

Figure 2
Sequence of the Set of Assessment Situations of Case 1 – Literary Creation
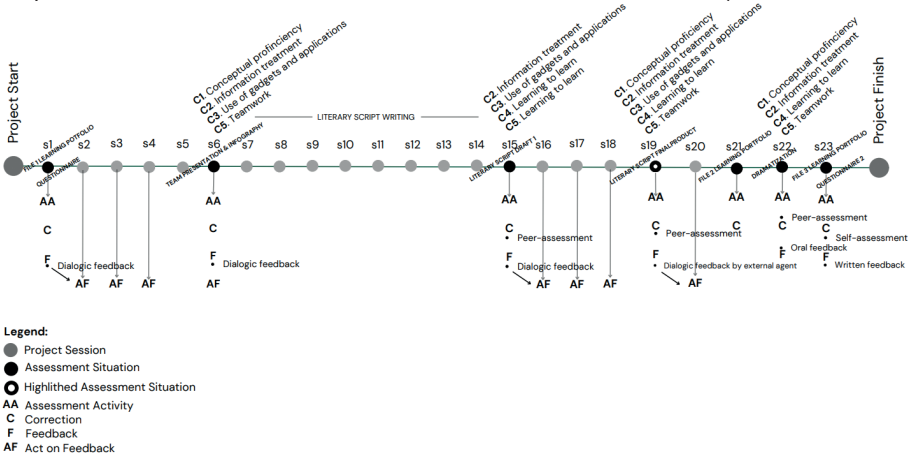

Figure 2 shows the temporal distribution of AS in a personalised learning practice configured by 23 sessions, of which 7 correspond to AS (s1, s6, s15, s19, s21, s22, and s23). The five transversal competencies are assessed: C1. Conceptual proficiency, C2. Information treatment, C3. Use of gadgets and applications, C4. Learning to learn, and C5. Teamwork. Each assessment activity (AA) is aligned with some or all the competencies. Assessment situations differ in complexity from the point of view of

the assessment moments they present. There is no evidence of preparation (P) of assessment. However, learners' participation in the correction is confirmed (C). Formative and dialogic feedback (F) predominates during the process and connects with upcoming learning experiences. It is also shown that dialogic feedback (s1, s6, s15, s19) makes it possible to act on feedback to improve activities. Acting on feedback (AF) can occur in the same session (s6) or in subsequent sessions (s16-s17-s18-s19). The AA in s19 (literary script-final product) is selected for the analysis in the following phases.

5.1.2. Potential of the Competency Dimension in the Assessment Activity

Below, the selected AA corresponding to the final product: the Literary Script in s19 is analysed.

Element 1. Context of acquisition and use: The AA is authentic from a double point of view. On the one hand, it has social relevance because the demand for the product has been made outside the school, from the neighbourhood's theatre. The AA allows access to the cultural knowledge of the social environment and, at the same time, contributes to its local community, becoming a social product with the potential to be performed theatrically in a natural context by the learners themselves or by acting professionals. On the other hand, it has personal relevance since the learners have investigated topics proposed by themselves that point to local and global problems, interest them, and directly affect them as adolescents (toxic relationships). The script's demands involved making joint decisions about the theme, the characters, the scenes, and their dramatisation, providing suggestions, making changes, and reflecting on the learning in small groups and the whole class with the help of the teacher and the theatre director (HP↑).

Element 2. Integration and functionality of diverse resources and knowledge: The AA is linked to the area of Spanish language and literature. In this area, the field of literary creation integrates diverse resources and knowledge, the five transversal competencies, and specific competencies to configure the linguistic mastery of learners. This AA has involved mobilising these resources and knowledge in an articulated and interrelated manner to develop a well-structured script with a logical sequence, without spelling and formatting errors, with an appropriate amount of dialogue, using ICT appropriately, and, working as a team, planning, assessing and being self-critical (HP↑).

Element 3. Effective performance: The script's development has enabled performances of medium-high complexity and autonomy. Learners and teachers have assigned a medium-high performance standard using a rubric with a scale from 1 to 4 and have placed their performance between ranges 3: good level and 4: excellent. The theatre director also recognises the performance of the AA as satisfactory, but with some nuances at a technical level to become a professional literary script (HP↑).

5.1.3. POTENTIAL OF THE TEMPORAL DIMENSION IN THE ASSESSMENT SITUATION

Below, the assessment moments before and after the AA corresponding to the Literary Script in s19 are analysed.

Element 1. Preparation: There is no evidence of previous moments of presentation, joint construction, or dialogue about the assessment criteria and performance standards that the teacher has created. Although two previous drafts have been assessed using these criteria, learners have not had explicit access to them (NP-).

Element 2. Correction: The learners' participation in the correction is carried out by assessing and making suggestions to improve the literary script through group peer assessment. However, the assessment criteria appear for the first time just before correcting (HP↑).

Element 3. Feedback: The feedback is dialogic and participatory, considering the defined criteria and performance standards. The learners critically value the scenes in a small group, and subsequently, a discussion takes place where the theatre director intervenes, who constructively criticises the scenes and contributes ideas based on his knowledge and experiences about the world of the theatre (HP↑).

Element 4. Act on feedback: Learners take these comments into account to reflect and make improvements to their literary script and future activities in writing and editing (HP↑).

5.2. Analysis Findings of Case 2: Technological Applications

Firstly, a temporal sequence illustrates how the AS are incorporated and distributed along the personalised learning practice (see Figure 3). Secondly, it details to what extent the competency dimension is presented in the AA corresponding to the team presentation in s10-s11-s12. Thirdly, whether assessment moments existed before and after the AA.

5.2.1. TEMPORAL DISTRIBUTION OF ASSESSMENT SITUATIONS IN A PERSONALISED LEARNING PRACTICE

Figure 3

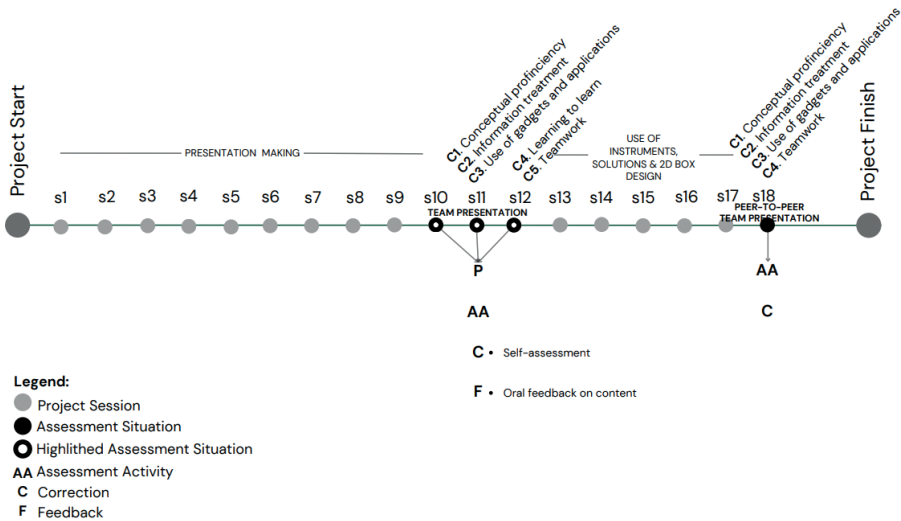*Sequence of the Set of Assessment Situations of Case 2 – Technological Applications*

Figure 3 shows the temporal distribution of the AS in a personalised learning practice configured for 18 sessions, of which 2 correspond to AS (s10-s11-s12 and s18). The five transversal competencies are assessed: C1. Conceptual proficiency, C2. Information treatment, C3. Use of gadgets and applications, C4. Learning to learn, and C5. Teamwork. Each assessment activity (AA) is aligned with some or all the competencies. Preparation (P) of assessment is evidenced in s10, s11, s12. Learners' participation is shown in the Correction (C). Feedback (F) is a single event focused on giving information on content, which not allows acting on the feedback (AF) to improve ongoing or upcoming learning experiences. The AA in s10, s11, and s12 is selected for the analysis in the following phases.

5.2.2. POTENTIAL OF THE COMPETENCY DIMENSION IN THE ASSESSMENT ACTIVITY

Below, the AA corresponding to the Team Presentation in s10-s11-s12 is analysed.

Element 1. Context of acquisition and use: The AA is contextual at a school and social level since it is linked explicitly to the needs and pro-

blems of the social environment and its institute (high levels of CO_2, lighting, and humidity). The topics investigated, and experiments carried out at the close of the presentation are linked to a local external company that conducts environmental evaluations, which has trained the learners in a previous project in the use of environmental meters (HP↑).

Element 2. Integration and functionality of diverse resources and knowledge: The AA is linked to science and technology. The AA allows the integration of resources and knowledge related to the five transversal competencies and area-specific competencies, such as the selection of information from different sources, the planning of the different sections of the presentation, the appropriate and precise use of language for oral communication, graphic design, the use of tools technological and virtual, mathematical thinking, among others. Acquiring these resources and knowledge allowed learners to collaboratively design a presentation based on investigating diverse scientific topics, present it to their classmates, and carry out an experiment where they applied that knowledge (HP↑).

Element 3. Effective performance: The performance of the presentations is carried out autonomously. The teacher recognises it as a good performance, but the content criteria must be improved (LP↓).

5.2.3. Potential of the Temporal Dimension in the Assessment Situation

Below, the assessment moments before and after the AA corresponding to the Team Presentation in s10-s11-s12 are analysed.

Element 1. Preparation: A moment of preparation is evident just before the correction of the C.5 Teamwork competition. The teacher projects and reads each of the evaluation criteria and standards so that the learners are guided and reflect on their performance as a team when assessing (BP↓).

Element 2. Correction: The presentation is assessed by the teacher, and group self-assessment is done by the learners (BP↓).

Element 3. Feedback: The teacher provides oral feedback focused on the deficiencies of the presentation aimed at developing the C1 competence (conceptual domain). Focusing only on science content does not support other competencies worked on in developing the activity (BP↓).

Element 4. Act on feedback: There are no instances to act on feedback given by the teacher (NP-).

6. Discussion

In light of the findings, we can affirm that the model has the potential to identify, analyse, and establish differences in competency-based assessment processes in personalised learning practices, as has been verified in the two cases analysed. The competency dimension of this model has made it possible to detect the complexity that assessment situations present considering the key characteristics in an assessment activity (context, integration and functionality, and performance), and the temporal dimension has allowed to detect the characteristics of the moments before (preparation) and after (correction, feedback and use of feedback) of the assessment activities (Bray & McClaskey, 2017; Coll et al., 2012; Darling-Hammond et al., 2020).

Regarding the competency dimension, the context of the assessment activity in case 1 has a high degree of authenticity in its two aspects, personal and social. From a personal perspective, the context encourages the learner's choice and voice (Schmid et al., 2022) and is linked to their interests and preferences (DeMink-Carthew & Netcoh, 2019). From a social perspective, it adjusts to the importance of connecting school learning with their experiences outside of school, that is, with their community environment (Bernacki et al., 2021; Membrive et al., 2022; Oller et al., 2024). In contrast, the assessment activity's authenticity level in case 2 is lower since the context in which it is framed does not sufficiently connect with learners' agency and social reality. On this basis, the model allows for identifying areas of improvement in future assessment activities.

Concerning integration and functionality (Levine & Patrick, 2019), although in both cases the assessment activity incorporates different resources and knowledge, in case 1 is more successful than in case 2. Moreover, in case 1, the performance of competencies is recognised by multiple agents (teacher, learners, and external professional), which is a fundamental aspect of credibility in assessment processes (Bouwer et al., 2023). In contrast, performance in case 2 is assessed mainly by the teacher, which reveals a need for learners' participation and other professionals to optimise assessment activities in ongoing situations.

Regarding the temporal dimension, the application of the model has allowed us to identify, in both cases, the elements in the moments before -as assessment criteria- and after the assessment activity -as feedback- for

acquiring autonomy and self-regulation. These findings align with previous proposals on the need for the progressive transfer of control to learners through assessment activities and go beyond pointing out the specific elements to support greater autonomy (Chen & Bonner, 2019; Darling-Hammond et al., 2020). In terms of what, who, how, and when it is assessed, the teacher is still largely in control, which does not fit the idea of transparency (Balloo et al., 2018) or co-creation of assessment criteria that some authors indicate (Fraile et al., 2017). Under these conditions, the criteria cannot be used by learners to adequately guide the assessment of their learning (Bray & McClaskey, 2017). It has also been evident that, in moments after the assessment activity, the criteria appear for the first time at the moment of correction, and from this moment, we find wide differences in how feedback and acting on feedback are developed. In case 1, the feedback is oriented towards the five competencies, considering the criteria and performance standards; it is dialogic, reflective, critical, and allows decision-making; that is, the learner can regulate action and act competently in subsequent learning experiences (Nieminen & Carless, 2023). In case 2, the feedback focuses only on giving information on conceptual domain of science content, leaving aside the other competencies, which are essential in improving learning. In this case, feedback is not enough, which makes it impossible to productively involve the learner so that they appropriate strategies that allow them to continue advancing in a more reflexive, autonomous, and self-regulated manner (Coppens et al., 2023; Esterhazy et al., 2021). Once both projects have been finished, the absence of feedback that promotes reflection on what has been learned and what is missing to continue improving is not evidenced. This finding contrasts with the approach of Carless and Winstone (2020) about the need to define, design, and carry out feedback strategies shared by teachers and students to maintain continuity in the learning trajectory for the subsequent learning experiences.

7. Conclusions and Implications

The main conclusion of this exploratory study is that the model of analysis of competency-based assessment seems potentially viable for understanding and improving the characteristics of assessment situations throughout personalised learning practices. The model allows to capture

the contextual aspects that give higher potential to the assessment activity in its two senses: personal and social. It also allows to capture the procedural nature and the complexity in each of the moments before and after the assessment activity, necessary to identify the possibilities of learners' participation to acquire greater autonomy and self-regulation.

However, the findings must be considered with caution as the study presents a limitation that consists of having applied the competency-based assessment model only to one assessment situation in each case, selected as the most relevant situation for developing competencies. Although this assessment situation has provided us with a reasonably broad understanding of how competency-based assessment is implemented, applying it to other assessment situations in the personalised learning practice would also be necessary. This action would imply a higher level of analytical demand in personalised learning practices that incorporate a high number of assessment situations with diverse, long-lasting, and complex characteristics, as in case 1. Furthermore, it would be necessary to consider under what specific criteria or circumstances we can select certain activities according to their relevance and pertinence to understand to what extent competencies are being developed and to what extent this level of recognition is sufficient to understand competency assessment in all its complexity.

Despite these limitations related to the complexity of the model, we consider that our findings have three key implications for teaching practice to successfully improve competency-based assessment. Firstly, findings show the importance of selecting authentic and relevant contexts for learners to evidence adequate levels of performance competencies to solve the demanded challenges. At the same time, findings offer some specific clues about how to construct this type of contexts by means of the promotion of connections with personal and social relevant environments that would be more likely that students can have a better performance. Secondly, findings evidence the necessity of designing moments before the assessment activity to reflect on criteria considering the voice of students to guide assessment. Finally, findings point out the importance of constructing moments after the assessment activity where teachers offer formative feedback and follow up the use of this feedback by the students. In this manner, the teacher scaffolding before, during and after competency-based assessment seems to be a key element to promote autonomous and self-regulated learners.

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8. Acknowledgements

9. Funding

10. Declaration of interest statement

We have no conflicts of interest to disclose.

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