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RESEARCH ARTICLE

Methodology for Diagnosing and Assessing Students' Foresight Competence in A Digital Learning Environment

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Abstract

This study presents a methodology for diagnosing and assessing students' foresight competence in a digital learning environment. The proposed approach integrates digital educational platforms, diagnostic tools, and data-driven assessment mechanisms to evaluate the cognitive, analytical, predictive, strategic, and reflective components of foresight competence. The methodology employs a combination of online testing, learning analytics, artificial intelligence-based support systems, and interactive feedback mechanisms to ensure continuous monitoring and comprehensive evaluation of students' progress. The INFORSIGHT platform serves as the primary digital environment for implementing the diagnostic process, enabling real-time data collection, performance analysis, and personalized feedback. The results demonstrate that the integration of digital technologies into assessment practices enhances the accuracy, objectivity, and developmental potential of foresight competence evaluation, contributing to the improvement of students' future-oriented thinking and decision-making skills.

KEYWORDS

Foresight competence, digital learning environment, diagnostic assessment, learning analytics, artificial intelligence, digital platforms, educational technology, student evaluation.

INTRODUCTION

The educational process organized through the integration of digital platforms requires the assessment of students not only through final test results but also through their learning activities, independent inquiry, behavior in digital environments, completion of practical projects, and ability to analyze their own outcomes. Therefore, the diagnosis of foresight competence should not be viewed as a simple form of assessment but rather as a multi-stage methodological system aimed at identifying students' abilities to analyze the future, consider alternative scenarios, make decisions, and redirect their activities based on obtained results.

The diagnostic and assessment methodology presented in this section is based on the structural-functional model substantiated in the previous sections of the dissertation. At the center of the model lies a five-component foresight competence consisting of motivational, cognitive, activity-based, reflective, and information-communication components. Each component is measured through specific indicators, diagnostic tools, and assessment criteria. Such an approach is associated with the need in competency-based education to interpret learning outcomes not merely as an accumulation of knowledge but as integrated readiness

demonstrated through practical activity.

Diagnostics in a digital learning environment differs significantly from traditional assessment in one important aspect: the teacher is able to observe not only the student's final answer but also the learning pathway that led to that answer. The frequency of platform access, time spent studying learning materials, test attempts, questions asked in chats, interactions with AI assistants, and reflective responses during detailed analyses together form a comprehensive diagnostic evidence base. Thus, the assessment process becomes an integrated system of monitoring, analysis, correction, and forecasting.

Pedagogical diagnostics serves to determine the current state of a student, identify gaps in development, introduce necessary adjustments into the educational process, and predict future outcomes. In this regard, diagnostics is a broader concept than assessment. While assessment records students' achievements at a specific point in time, diagnostics identifies the factors influencing those achievements, determines which competence components are strongly or weakly developed, and reveals what methodological support is required.

The diagnosis of foresight competence is based on the principles of validity, reliability, transparency, multi-source evidence, and corrective orientation. Validity implies that assessment tools should measure foresight competence itself. Reliability ensures that assessment results are minimally influenced by random factors. Transparency enables students to understand why they received a particular score, while the principle of multi-source evidence requires the combined analysis of test results, projects, questionnaires, digital traces, and reflective activities.

The study adopted a mixed-methods research design that integrates qualitative and quantitative approaches to gain a comprehensive understanding of how decision-making skills are developed among prospective teachers. The qualitative component involved exploring the experiences and perspectives of teacher educators and students, whereas the quantitative component focused on measuring the effectiveness of pedagogical interventions in enhancing decision-making competencies. This design allows for an in-depth analysis of both the pedagogical strategies employed in teacher preparation and their impact on prospective teachers' decision-making abilities. The integration of qualitative and quantitative data provides a holistic understanding of how these skills are developed within authentic educational contexts.

Within digital platform-based diagnostics, evidence is collected from three main sources: first, test and assignment results; second, automated statistical indicators generated by the platform; and third, students' reflective responses and practical projects. These three sources together establish an evidence-based assessment model. This approach is widely applied in learning analytics research, enabling the investigation of learners' actual activities through digital evidence.

In this study, foresight competence is considered an integrated quality consisting of five interrelated components. Consequently, assessment is conducted separately for each component. Every component serves a distinct diagnostic function. The motivational component reflects students' interest in understanding the future and their need for planning professional development. The cognitive component identifies theoretical knowledge related to foresight methods, digital technologies, and strategic analysis. The activity-based component assesses the application of this knowledge in practical situations. The reflective component evaluates students' ability to analyze their own mistakes and learning experiences, while the information-communication component measures proficiency in using digital platforms and modeling tools.

The component-based approach ensures fairness in the assessment process because a single overall score cannot adequately reveal students' strengths and weaknesses. For example, some students may possess strong theoretical knowledge of foresight concepts but experience difficulties in developing practical scenarios. Others may actively engage with digital platforms and successfully complete projects yet demonstrate insufficient ability to reflect on and analyze their own mistakes. Therefore, each component is assessed using specific diagnostic instruments tailored to its unique characteristics.

In the assessment of foresight competence, criteria and indicators are distinguished from one another. A criterion represents the general direction of assessment, whereas an indicator is an observable and measurable manifestation of that criterion. For example, the criterion of "strategic decision-making" can be identified through indicators such as the ability to compare several alternative options, explain the potential consequences of each option, and justify the selected solution

with evidence and arguments.

The diagnostic capabilities of the INFORSIGHT platform enable assessment to be conducted in real time. Through the statistics dashboard, instructors can monitor the performance of both groups and individual students; the testing module helps identify cognitive knowledge levels; detailed analytics and the AI assistant facilitate reflective learning processes; and the chat module provides opportunities for individualized feedback. As a result, assessment is transformed from a final control mechanism into a developmental pedagogical process that supports continuous learning and improvement.

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