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Paper

Quality of Digitally Enhanced Learning Through Students' Eyes

Abstract

Ensuring the quality of e-courses requires more than adherence to established course design standards. It also requires an understanding of how students experience these courses and which course characteristics they consider important for supporting their learning. This paper presents findings from a national survey of higher education students in Estonia, conducted in November–December 2025 by the e-course quality working group coordinated by the Estonian Quality Agency for Education (HAKA).

The survey collected responses from 438 students representing 16 Estonian higher education institutions. Students rated the importance of 25 characteristics related to e-course quality and provided open-ended feedback on factors supporting or hindering learning.

The findings support the relevance of existing expert-defined key quality criteria from the students' perspective. Students particularly valued straightforward assignment submission, transparent assessment, technical reliability, clear instructions and a logical course structure. The qualitative findings further emphasised the importance of meaningful and timely feedback. Views on collaborative learning were more varied, while instructor-provided AI chatbot support was considered important by fewer than half of respondents.

The paper argues that quality assurance frameworks should combine expert-defined standards with systematic learner feedback. Based on the findings, recommendations are proposed for refining e-course evaluation criteria, strengthening internal quality assurance and supporting the development of learner-centred course design.

Keywords: digitally enhanced learning, quality assurance, student perspectives, e-course quality, higher education, learner-centred education

1. Introduction

Digitally enhanced learning has become an integral part of higher education, creating opportunities for flexible, accessible and personalised learning. In this paper, digital learning refers to learning enhanced by digital tools, regardless of the mode of delivery (e.g., distance, face-to-face or blended learning). However, the growing diversity of digital learning environments and instructional approaches, together with the emergence of new technologies, poses challenges for quality assurance.

E-course quality assurance frameworks use criteria developed by educational experts, instructional designers and quality assurance professionals. These criteria address course structure, learning outcomes, learning materials, assessment, communication and technical functionality.

Alongside expert judgement, students' views are needed to understand which course characteristics they consider important for supporting their learning.

This raises three questions:

1. Which characteristics of e-courses do students consider most important for supporting their learning?

2. To what extent do the e-course characteristics that students consider important align with existing expert-defined quality criteria?

3. How can these student priorities inform improvements to e-course quality assurance frameworks and practices?

This paper addresses these questions using findings from a national survey of higher education students in Estonia conducted in 2025, comparing students' priorities with existing e-course quality criteria.

This article presents a condensed and revised English-language version of the Estonian study report (Pilt et al., 2026).

2. Context: E-course Quality Assurance in Estonia

In Estonia, the Estonian Quality Agency for Education (HAKA) coordinates the national e-course quality label application and assessment process to support the systematic improvement of digital learning quality in higher education. The process is based on an e-course quality framework (Estonian Quality Agency for Education [HAKA], 2021) organised around the five phases of the ADDIE instructional design model: analysis, design, development, implementation and evaluation (Molenda, 2003). The quality label process involves evaluating courses against established criteria, recognising courses that meet the required standards and providing developmental feedback to course authors.

Seven criteria within the framework were previously identified as key criteria using the interrelationship diagram method (Brassard & Ritter, 1994).

Of these seven key criteria, four carry the greatest weight:

- The course learning activities and assessment methods are aligned with the learning outcomes.
- The e-course is logically structured and easy to navigate.
- The e-course provides clear and comprehensive instructions for completing the course.
- The e-course is technically functional, and the technical requirements for using the course are clearly presented to the learner.

The remaining three key criteria concern the alignment of course content with learning outcomes, the transparency of assessment and feedback principles, and adherence to good practice in the design of digital learning materials.

These criteria reflect an expert-informed understanding of e-course quality. The present study examines whether students also consider these characteristics important for supporting their learning.

3. Methodology

3.1. Research design and participants

The e-course quality working group conducted a cross-sectional online survey in November–December 2025. Students from all Estonian higher education institutions were invited to participate through student representative bodies and institutional mailing lists.

A total of 438 students from 16 higher education institutions participated: six universities and ten universities of applied sciences. The respondents included 312 students in bachelor's or professional higher education programmes, 103 master's students, 17 students in integrated degree programmes and six doctoral students.

3.2. Research instrument

The questionnaire comprised 25 statements about e-course quality and eight open-ended questions. The statements were adapted from the existing e-course quality criteria and worded to make them clear and relevant to students. Statements representing key quality criteria corresponded to a single key criterion, except for one statement that combined two key criteria. Respondents rated the importance of each characteristic for supporting their learning by selecting one of five response options: “very important”, “rather important”, “rather unimportant”, “completely unimportant” and “cannot assess”.

The statements covered six thematic areas:

- Learning outcomes and course content
- Support for learning
- Learning materials
- Technology and usability
- Communication and collaboration
- Assessment and feedback

3.3. Data analysis

For the quantitative analysis, responses of “very important” and “rather important” were combined to determine the number of respondents who considered each characteristic important. For each characteristic, this number was divided by the total number of respondents (N = 438), including those who selected “cannot assess”, and multiplied by 100 to obtain the percentage. The characteristics were then ordered by how frequently they were rated as important. Internal consistency across the 25 importance-rating items was assessed using McDonald’s omega ($\omega = 0.910$).

Open-ended responses were analysed thematically. Generative AI (ChatGPT Edu, using GPT-5.2) supported the initial grouping and summarisation of responses. The researchers checked the summaries against the original responses, refined the themes and developed the final interpretations.

Students’ importance ratings were compared with the existing expert-defined key quality criteria to examine the alignment between student priorities and the framework.

Participation was voluntary, resulting in a self-selected, non-probability sample. The findings therefore describe the priorities of the participating students and cannot be assumed to represent those of the entire Estonian student population.

4. Results and discussion

4.1. Students prioritise clarity, usability and reliability

Most e-course characteristics were widely considered important for supporting learning. Twenty of the 25 characteristics were rated as “very important” or “rather important” by more than 80% of respondents. Ease of assignment submission was the most frequently valued characteristic, rated as important by 431 of the 438 respondents (98.4%). This was followed by transparent assessment criteria (426 respondents; 97.3%), technical reliability (424; 96.8%), clear instructions (422; 96.3%) and a logical course structure (422; 96.3%).

Table 1. Perceived importance of e-course characteristics for supporting learning (N = 438).

No.	Questionnaire statement	Rated as important, n (%)
1.	Independent assignments and tasks can be submitted easily and conveniently in the e-course.	431 (98.4%)
2.	I understand the criteria used to assess my performance in the e-course. **	426 (97.3%)
3.	The e-course functions reliably: links, files, and referenced resources open without problems. ***	424 (96.8%)
4.	The e-course provides clear instructions that help me understand what I need to do, when, and why. ***	422 (96.3%)
5.	The course structure is simple and logical. ***	422 (96.3%)
6.	I clearly understand how the e-course tasks and learning materials help me learn and achieve the learning outcomes. ***; **	421 (96.1%)
7.	All learning materials are available and easy to find in the e-course.	421 (96.1%)

8.	The e-course clearly specifies what I should know or be able to do upon completing the course.	416 (95.0%)
9.	I am informed of my results (e.g., grades, points) in the e-course in a timely and regular manner.	411 (93.8%)
10.	The e-course provides opportunities for active learning, such as completing exercises, answering questions, or applying what I have learned.	407 (92.9%)
11.	Feedback is meaningful and helps me understand how I am progressing in my learning.	399 (91.1%)
12.	I receive comprehensive support and guidance in the e-course to help me complete the course successfully.	397 (90.6%)
13.	I receive regular feedback on my learning.	383 (87.4%)
14.	The visual design of the e-course supports understanding of the learning content. **	383 (87.4%)
15.	The learning materials, assignments, and other activities in the e-course are consistent with the course's allocated workload (1 ECTS credit equals 26 hours of student work).	377 (86.1%)
16.	I can communicate with the instructor both publicly (e.g., in a forum) and privately.	374 (85.4%)
17.	The course uses a variety of materials (e.g., texts, images, videos, and audio files).	370 (84.5%)
18.	The e-course helps me develop my learning skills (e.g., time management, reflection on learning, and goal setting).	369 (84.2%)
19.	The e-course can be accessed using mobile devices.	363 (82.9%)

20.	I can provide feedback on the content and structure of the e-course.	358 (81.7%)
21.	Other authors' works are properly referenced in the e-course learning materials.	339 (77.4%)
22.	The course content has been designed to take account of learners' mental and physical characteristics and needs.	324 (74.0%)
23.	The e-course supports collaboration with other learners (e.g., discussions and group work).	273 (62.3%)
24.	The e-course provides opportunities to collaborate and learn with others.	268 (61.2%)
25.	The instructor has provided an opportunity to learn with guidance from a chatbot in the e-course (e.g., support with homework and working through learning materials).	193 (44.1%)

Notes:

"Important" combines the responses "very important" and "rather important". Values are presented as the number and percentage of respondents. Asterisks indicate correspondence with expert-defined key quality criteria:

*** = weight 3;

** = weight 2.

Weights 2 and 3 apply to quality label assessments, not to the analysis of student responses.

Statement 6 corresponds to two key criteria, weighted 3 and 2, respectively.

The characteristics most frequently rated as important concerned ease of submission, clarity of expectations, technical reliability and course organisation.

The importance students attached to technical reliability, clear instructions and transparent assessment criteria suggests that they value conditions that allow them to focus on learning content, understand expectations and plan their learning with minimal technical or organisational obstacles.

These findings support treating usability, clarity and technical reliability as core dimensions of e-course quality.

4.2. Alignment between expert criteria and student priorities

Students frequently rated characteristics associated with the framework's key quality criteria as important for supporting their learning. Five of the seven statements most frequently rated as important corresponded to six of the framework's seven key quality criteria, with one statement covering two

criteria. This alignment was particularly evident in technical reliability, a logical course structure, clear instructions, transparent assessment criteria and the alignment of learning activities with intended learning outcomes. The findings support the relevance of existing expert-defined key quality criteria from the students' perspective.

The findings also suggest opportunities to refine the framework. The availability and ease of finding learning materials were considered important by 421 respondents (96.1%), while visual design that supports understanding was valued by 383 respondents (87.4%). Both characteristics were widely considered important, although a larger proportion of respondents valued the availability and ease of finding materials. Qualitative responses highlighted clarity, relevance, accuracy, manageable scope and practical usefulness as valued features of learning materials.

These findings suggest that the criterion on learning material design could be clarified to emphasise the clarity, organisation and availability of materials, including how visual design supports understanding of content.

One possible refinement would be to clarify what the criterion on learners' mental and physical characteristics and needs means in practice, particularly for providing accessible materials and flexible opportunities to participate. Clearer guidance could help course authors and evaluators apply the criterion consistently. However, the importance ratings alone do not establish which specific changes are needed.

4.3. Students value meaningful and timely feedback

Assessment and feedback emerged as recurring themes in both quantitative and qualitative responses. The statement on transparent assessment criteria was rated as important by 426 respondents (97.3%), the second-highest proportion among the 25 statements. Timely and regular communication of assessment results was valued by 411 respondents (93.8%), meaningful feedback by 399 respondents (91.1%) and regular feedback by 383 respondents (87.4%).

Qualitative responses showed that students distinguish between receiving a grade and receiving feedback that helps them learn. They expected feedback to explain what they had done well, where they had made mistakes and how they could improve. They also wanted feedback in time to apply it to subsequent tasks.

These findings suggest that students value feedback as a means of guiding their learning, beyond its role in communicating assessment results. For quality assurance, the presence of a feedback mechanism is therefore an insufficient indicator of its usefulness. The existing criterion concerning feedback on learners' strengths, weaknesses and progress could be refined to address the clarity, specificity, timeliness and developmental value of feedback. Course evaluations could examine whether feedback helps learners understand their performance and identify practical steps for improvement.

4.4. Collaborative learning requires purposeful design

Students' views on the importance of collaborative learning were more varied. Opportunities to collaborate and learn with others were considered important by 268 respondents (61.2%), while support for collaboration through activities such as discussions and group work was valued by 273 respondents (62.3%). Although both characteristics were considered important by a majority of respondents, the proportions were lower than for most other characteristics.

Open-ended responses illustrated this variation. Some students appreciated collaborative assignments and discussions, while others preferred independent learning or associated group activities with scheduling difficulties, unequal distribution of responsibilities and unclear purposes. These responses suggest that students' reservations may concern how collaboration is organised and experienced.

The findings do not establish that collaborative learning is unnecessary or ineffective. They instead highlight the importance of making its learning purpose clear and providing appropriate structure and guidance. Clearly defined responsibilities, transparent assessment arrangements and flexibility in participation may help address the concerns expressed by students.

Quality criteria should therefore examine how collaborative activities contribute to intended learning outcomes and how their design supports participation. The findings also identify purposeful collaborative course design as a potential focus for academic staff development.

4.5. Instructor-provided chatbot support is less frequently rated as important

Learning with guidance from an instructor-provided chatbot was the least frequently valued characteristic. It was considered important by 193 respondents (44.1%), while 200 respondents (45.7%) considered it unimportant and 45 respondents (10.3%) selected "cannot assess".

These results concern a specific application: an instructor-provided chatbot offering guidance with assignments and learning materials. They should not be interpreted as a general rejection of artificial intelligence in education. Fewer than half of respondents rated this particular form of support as important, but the results do not explain whether their ratings reflected previous experience, perceived usefulness, preferences for other forms of support or other factors.

For quality assurance, these findings suggest that instructor-provided chatbot support should not be treated as a universal requirement for e-course quality. Where such support is used, evaluation should focus on its educational purpose, the quality of its guidance and its contribution to the intended learning outcomes. Further research could examine how students' experiences with different forms of chatbot support relate to their assessments of its usefulness.

5. Conclusions

This study examined which e-course characteristics students consider important for supporting their learning and how their priorities relate to existing expert-defined quality criteria. Among the 438 participating students, 20 of the 25 characteristics were considered important by more than 80% of respondents. Ease of assignment submission, transparent assessment criteria, technical reliability, clear instructions, a logical course structure and readily available learning materials were among the characteristics most frequently rated as important. The high proportions of students valuing characteristics associated with the framework's key criteria support the relevance of these criteria from the students' perspective.

The findings also suggest directions for refining e-course quality assurance. Students' responses highlighted the value of clear, relevant and practically useful learning materials and feedback that explains performance and guides improvement in time for subsequent tasks. Responses concerning collaborative learning highlighted the importance of clear purposes, appropriate structure and guidance. Instructor-provided chatbot support was considered important by fewer than half of respondents, suggesting that its inclusion should be evaluated in relation to the learning needs it addresses. These findings can inform revisions to the HAKA e-course quality criteria, course self-assessment and professional development for academic staff.

The study used a self-selected sample, and the findings cannot be assumed to represent the entire Estonian student population. They describe perceived importance rather than the measured effects of course characteristics on learning. Combining "very important" and "rather important" responses identifies how widely each characteristic was valued but does not distinguish between these two levels of importance. Further research could examine differences across student groups and learning contexts, as well as relationships between students' priorities, course experiences and learning outcomes.

Overall, the study supports complementing expert-defined quality criteria with systematic student feedback to guide the development of e-courses that respond to learners' priorities.

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