Analysis of Blended Course Quality Metrics: Research, University and Student Perspectives

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Introduction

Nowadays, learning delivery includes online and blended formats, making it crucial to maintain high standards in course quality. However, there is a problem in finding a single answer to the question of which metrics define the quality of courses. The variety of metrics make it difficult to assess what course quality is and how it should be measured. This research discusses different perspectives of blended course quality estimation. First, an analysis was conducted on the quality metrics recommended by existing research papers. Second, it examines the course quality assessment metrics used by universities. Finally, it analyzes which aspects are most important to students. The blended course quality measurement analysis is targeted on identification of key metrics, to measure in automated way. This is why it is important **to find the most common measures among all three parties**.

While research and university used criteria for course quality estimation are at least partly structured, our analyzed student feedback data is not oriented directly on e-course quality metrics. We use student feedbacks for different courses to highlight what topics are the most common, relevant to students. The feedback data was selected as more natural way to reflect real situation, rather than do survey for key factor identification. Therefore, for the feedback analysis, we incorporate different **text analysis and clustering methods**, aiming to understand student preferences and needs for blended courses and identify areas for improvement.

Materials & Methods

Research defined course quality criteria are the results of analyzing 3524 research papers. These criteria include familiarity with the course purpose and structure, clarity and measurability of learning outcomes, and activities designed for real-world skill development. The criteria also include consistency in assessment methods, promotion of interaction and feedback through collaborative assignments, quality and relevance of course content, clarity in course organization, and the use of multimedia for enhanced interactivity. A **systematic approach** to the related work analysis allowed to gather 11 main course quality dimensions and 47 lower-level criteria, defining the main e-course quality metric.

The **university** perspective was analyzed by examining existing e-course accreditation and evaluation methodologies and requirements in 3 technical universities (VILNIUS TECH, TalTech and RTU). **Comparative analysis** and criteria linking with the generated scheme (Fig. 4), allow to get a view on what type of criteria are common between different universities.

Student perspective for course quality was estimated by their **open-ended answers** in the course evaluation surveys. It was concentrated on English speaking students only. The texts, written by students to comment the course quality and improvement paths, contained 1623 records, for courses, delivered within 2 years, starting from 2019 September. The records were cleaned, to remove duplicates and not meaningful feedback texts as “Nothing”, “None”, “OK”, and similar. This led to 753 unique answers. For **semi-automated text analysis**, the texts were pre-processed by using UDPipe Lemmatizer, filtering of stopwords and numbers, unigrams, which appeared at least 10 times (which reduced the keywords to 116, rather than 1231). Several approaches were used for the pre-processed text analysis:

- **Word Cloud** (Fig. 1). It allowed to visualize what are the keywords, used in students feedbacks and highlight its importance.
- **Clustering** (Fig. 2). After using document embedding with Multilingual SBERT, Hierarchical and k-Means methods were used as those, who allow to select preferred number of clusters. Each cluster was presented as Word Cloud or list of keywords to analyze the content of the feedbacks.
- **Topic modelling** (Fig. 3). Latent Dirichlet Allocation (LDA) model was used to dive deeper into term relevance for different clusters.

Iterative analysis of all the 3 analysis areas were repeated experimenting with different parameters and aligning the obtained results with the research and university used metrics for blended course evaluation metrics. As a final result, the mapping between all three perspectives is done (Fig. 4).

Findings of Student Feedback Analysis

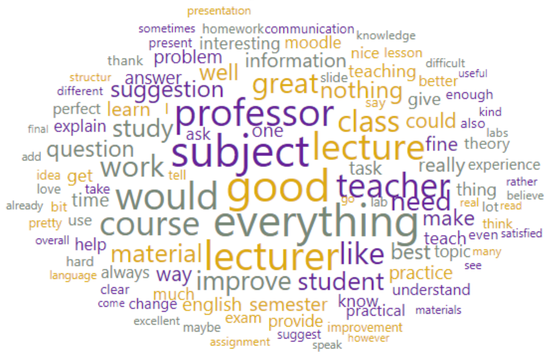

Fig. 1 Word cloud of all feedback keywords

Students usually mention words:

- good – 146 instances
- subject – 138 instances
- everything – 95
- lecturer – 81
- professor – 77

It highlights the importance of the teacher, not just the course itself.

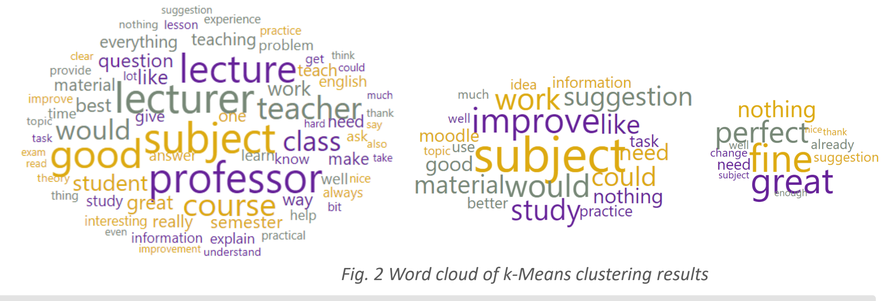

Fig. 2 Word cloud of k-Means clustering results

K-Means clustering revealed the clearest clusters:

- Study process – defining keywords, related to teacher, study and evaluation.
- Study material – defining keywords, related to course topics, Moodle environment.
- Study experience – defining keywords, related to student feelings during the course.

The number of records in the clusters are not equal, therefore hierarchical clustering was used too, to analyze clusters, based on the similar record numbers.

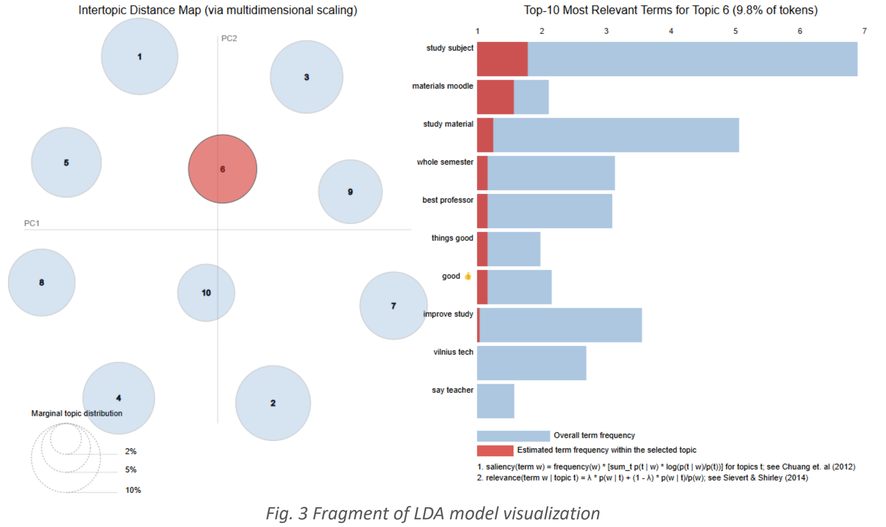

Fig. 3 Fragment of LDA model visualization

Topic modelling allowed easier bi-gram saliency and relevance analysis, trying to estimate the most suitable number of topics, based on the topic content.

Mapping Result of Different Perspectives

From the figure below, it is visible that the four main criteria categories important in course quality evaluation are course delivery, learning material, evaluation, and students. A comparative analysis was conducted to identify similarities and differences between all perspectives. As a result, criteria that match across all perspectives are colored green. This allowed for a deeper understanding of how these various perspectives align with each other.

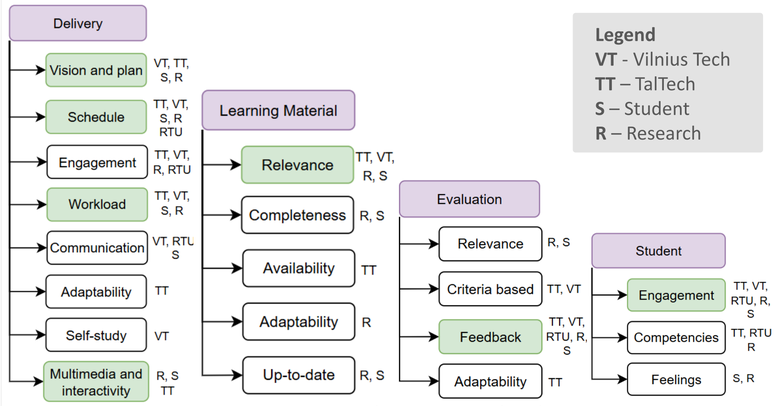

Fig. 4 Mapping research, university and student perspectives

Conclusion and Future Work

This study analyzed students’ feedback, providing important information about course quality metrics. The findings showed the importance of considering student perspectives in evaluating and improving courses quality. However, the research is limited by its focus on only one study program and the semi-automatic processing of feedback. Future research should use automated methods for preprocessing feedback and expand the analysis to include multiple study programs. This approach could lead to a better understanding of course quality across different study programs and courses.

Acknowledgement

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