

Improving Student Engagement and Reducing Dropout through a University App Feature: A Case Study in Higher Education

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Abstract

This paper describes the process of the conceptual and prototypical implementation of a feature within a university-related app. The primary goal of that app is to increase motivation to study and counteract the universities' drop-out rate. The high relevance of the feature gained by conducting several evaluation processes. Around 90 percent of the surveyed students believed the so-called "blackboard" has a positive influence on motivation to study. In addition, a priority list of desirable changes was drawn up with the help of the interviews conducted. The needed Reporting System has been left out of the current version of the feature, for further evaluations. While Development was a big part of this project, this paper also incorporates the evaluations, surveys and interview results that have been acquired. It also gives a lookout for future implementation processes needed as well as insight into integrating "blackboard" within the already existing university application.

1. Introduction

For many students, obtaining a Bachelor's or Master's degree is an opportunity to better position themselves within their professional environment, which also leads to better working conditions [1]. Regarding this, numerous degree programs are offered with different admission restrictions. Nevertheless, students may be confronted with problems during the course of their studies and sometimes have to drop out. In 2020, the average drop-out rate at universities of applied science was around 27%. This rate varies depending on the subject's of study. An example is the Bachelor's degree programme in the humanities at German universities, where the drop-out rate of 49% is significantly higher [2].

In order to counteract the increase of the drop-out rate, most colleges and universities are endeavouring to take various approaches to ensure support for students. In several cases, however, the target group is not or only barely aware of the relevant services, such as those offered by counselling centres [3]. Moreover, a huge number of individual students with subjective doubts, who find it difficult to make use of

counselling, is observable [4].

In addition, other approaches can have an indirect effect on each student, reducing the fear of failure during their studies [3]. Mittweida University of Applied Sciences developed the 'HSMWmobil App', which includes various functions. These functions are designed to help students find their way around the university, as well as in everyday life and the study programme. These include, for example, the grade display or the timetable. The aim of this app is to support students in their activities at the university in order to minimise excessive demands right from the start of their studies. By continuously improving the app and developing additional functions, the goal is to indirectly influence students to reduce the fear of dropping out of university.

2. Literature Review

A well-chosen selection of literature is essential for establishing a theoretical foundation, validating the study's significance, and ensuring methodological reliability. The sources referenced offer insights into student dropout rates, psychological challenges, and digital solutions that enhance engagement. This review explains why these sources were chosen and why others were not included.

OECD reports and studies on dropout rates provide an authoritative analysis of educational trends. OECD's "Education at a Glance" delivers internationally recognized statistics, while Heublein [2] present specific empirical data on dropout rates in Germany. Reports from individual universities did not meet the selection criteria due to their narrower scope and potential biases.

Beckmann et al. [3] analyze the effectiveness of student counseling services in preventing dropouts. Their study stands out for its empirical depth and focus on structured intervention strategies. While other research on student support exists, this work directly addresses early prevention, making it particularly relevant.

Brown, Barry, and Todd [4] explore psychological and gender-related barriers that prevent students from seeking academic help. Their study complements this

research by highlighting engagement obstacles that contribute to dropout rates. Although other literature examines help-seeking behavior, this work provides a comprehensive, peer-reviewed perspective.

Pang and Lee [5] examine sentiment analysis, while Grob and Vossen [6] explore Web 2.0 developments and their influence on digital communities. These studies provide valuable insights into user engagement in digital spaces, making them highly relevant to the “blackboard” feature in the university app. While alternative technological studies exist, these sources contribute essential methodological perspectives that align with the study’s goals.

Kleining [7] discusses qualitative research approaches, with a particular focus on semi-structured interviews. Their work offers valuable guidance for applying qualitative methodologies in higher education research. Although other sources cover research methods, these studies best support the approach taken in this study.

Faul et al. [9] contribute key insights into statistical power analysis, ensuring the study’s sample size evaluation remains statistically sound. Their widely recognized G*Power 3 tool provides a solid foundation for assessing statistical significance, making it the most appropriate choice for this research.

This selection of literature balances credibility, relevance, and accessibility. The research draws primarily from peer-reviewed journal articles, comprehensive statistical reports, and established academic sources. Every reference directly connects to dropout rates, student motivation, digital engagement, or qualitative methodologies, ensuring alignment with the study’s objectives. Non-English and non-German sources were excluded when translations were unavailable to maintain clarity.

The chosen literature forms a strong empirical foundation for this research. While additional sources could have supplemented the discussion, these references effectively support the study’s main arguments. Future research may incorporate broader datasets or alternative methodologies to expand on these findings.

3. Methodology

This study examines whether a newly implemented function in the app provided by the university can lead to a reduction in students dropping out at Mittweida University of Applied Sciences. This function is to be implemented and initially evaluated with a survey of students. The aim of the survey is to draw initial analyses and conclusions that will lead to an adjustment of the function. These changes are to be integrated into the function. A second survey will be conducted to examine the extent to which the new modifications provide students with better support in their studies and thus reduce the fear of dropping out.

3.1. Development

The aim during development was to increase motivation to study and reduce the fear of failure by providing students with a networking opportunity. For this purpose, a function called “blackboard” was developed, which should offer students the opportunity to create, manage and, if necessary, change or delete posts. The primary aim of the posts is to form learning groups or workshops. The “blackboard” should also be able to organise posts by category in different tabs to ensure a simple overview of all available posts. In addition, students should be able to filter for specific posts, for example by a specific date or topic.

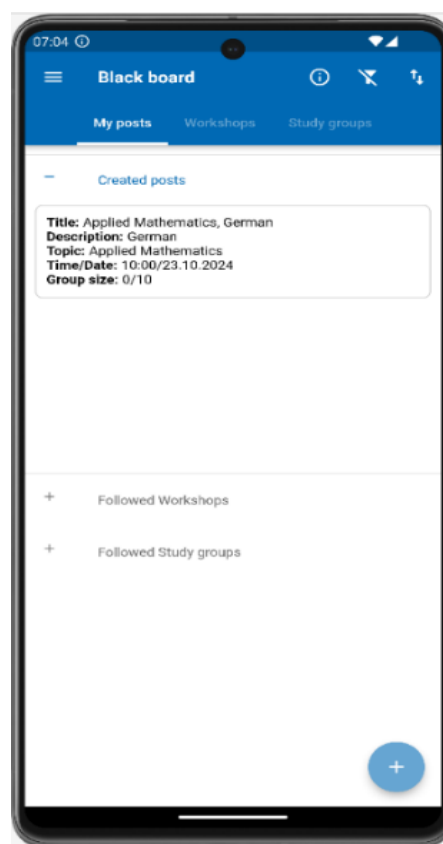


Figure 1. Main screen in the “blackboard”

To create a post, the following parameters must be specified: the description, the topic, the date, the time, the initial group size and whether it is a one-off event or weekly recurring event. The title of a post is generated automatically after the description and topic have been selected. Created posts are then displayed in the form of cards in a list, in which all important information is displayed. By tapping on a post, it is displayed in its own pop-up window, which contains all the essential information as well as buttons to follow or report the post. If a post is followed, it is displayed in the first tab ‘My posts’ under ‘Followed workshops’ or under ‘Followed learning groups’, depending on the type of post. For posts, which a user

created themselves, the buttons in the pop-up mentioned above change to 'Delete' and 'Edit'.

In the edit view, all the information entered can be changed, and membership requests can be managed. It is also possible to accept or reject interested parties and send an E-Mail to the members. The "blackboard" offers the option of opening a suitable e-mail app with a pre-filled e-mail text containing the post's title and the relevant information about the contribution. This makes it possible to automatically insert the title of the post. The view of the main screen is shown in Figure 1.

The brief explanation of the functions describes the final product of the "blackboard", but various iterations were run through to achieve this.

To begin with, a prototype was developed with Figma¹, which was used to form the basis for further iteration processes. Feedback from the target group enabled improvements and enhancements to be taken into account. For the first iterations, the focus was placed on conceptualising possible functions for the "blackboard". As a result, a qualitative survey was conducted to record how the test subjects perceived the design, functionality, and structure. In some cases, the deviation of the "blackboard's" design from the rest of the app was criticised. Other points, such as the start screen, post creation and filter function, were perceived as very good. Especially in terms of design, functionality, and view/structure, which significantly simplified the development process of the "blackboard". Due to comprehension problems, the search function was criticised. Initially, the intention was to enable users to search for specific posts. However, this resulted in strong overlaps with the filter function, which is why the decision was made not to implement it. By analysing the survey, it was possible to identify all the important elements of the "blackboard".

In the subsequent development process, the Flutter² framework including the Dart programming language was used in favour of using the code base of the university app, which also made it possible to harmonise the design. The prototype created in Figma was initially used as the basis for the functions within the "blackboard". The final development status of the feature was achieved through several meetings with the project coordinator and by collecting feedback from the target group.

The use of free text was deliberately avoided to minimise the general moderation effort [5]. Although this restriction has the disadvantage that posts can be created less clearly, it eliminates the need to moderate names and descriptive texts. To ensure that users are still able to create posts that are specific and suitable for them, a tag system was developed that is based on other websites and apps, such as the ticket system in the DB navigator app³.

The aim of this is to limit the selection options in the form of main topics, which are divided into sub-topics by hierarchies. Tags are predefined terms for the user and can be customised on the server side using lists. This structure enables users to find or create their topic quickly and easily without having to pay attention to spelling or the exact availability of a term [6].

The function also offers the option to search for tags. The selectable tags are largely derived from the university's study programmes but could be supplemented or reduced by other terms and extended by other tag lists. Mapping is used to create a hierarchy tree that is linked to a drop-down menu. This makes it possible to avoid choices with numerous options. As a result, it is easy to navigate through the various topics and customise a post in the "blackboard" using the predefined tags.

Especially when launching the "blackboard", it is crucial to offer users as many options as possible for customising their posts in order to encourage a positive response and high usage rate. If important or frequently requested tags are missing, the app has to offer an option to add and remove new tags easily and efficiently via the server connection. Furthermore, it is necessary to expand the drop-down menu with new categories — without direct intervention in the code. If no posts are created, students cannot network with each other, which is why the creation of a post has a high priority in terms of functionality and usability. The ability to follow a post or submit a join request is the first step towards networking with other students and supporting each other.

The reporting function (RF) is intended to serve as a good moderation tool for the "blackboard" in the future. Although the usability and utilisation would be strongly limited to no free input fields, this does not cover all gaps for misuse of the "blackboard".

To counteract this, the RF should enable users to report other users. Users who upload an excessive number of unnecessary or identical posts to the "blackboard" or do not fulfil their responsibility towards their own posts can be reported in order to improve the overview and moderation of the "blackboard".

It is important that the post itself is reported and not the user directly, so that the actual offence is displayed. The user should be able to click on a 'Report' field to open a dialogue window in which they can choose from a selection of predefined violations. The current version of the "blackboard" should focus on offences such as 'neglect of responsibility' and 'post spam'. After the user has selected an offence, a verification is carried out to ensure that it is not a miss click before the offence is reported. If this is confirmed, the report ticket created is checked internally on the server.

¹ <https://www.figma.com/de-de/>

² <https://flutter.dev>

³ <https://www.bahn.de/service/mobile/db-navigator>

Each user receives a counter within the server that records the number of offences. A fixed limit of 5 offences is currently assumed. The counter increases by one for each offence reported. If there are 5 or more offences, the contributor is automatically blocked and informed via e-mail that access to the “blackboard” is blocked. They can regain access by contacting the university directly.

Both the post creator and the reporter are noted on the server to prevent misuse of the RF. If the university suspects that a reporter is misusing the reporting function, access to the “blackboard” can also be withdrawn from this user.

Users who wish to lift their block must contact the responsible office in person, which is responsible for moderating the “blackboard” or the university app. The university has the authority to decide whether access to the “blackboard” will be granted again.

In the event of misuse of the RF, affected contributors should be given access to the “blackboard” again immediately and informed via email that access has been restored.

All that being said, realising this additional feature could be its own paperwork due to the complex nature a RF has. And keeping in mind, that this tool in general and each feature is aimed towards keeping motivation high or furthermore starting it. It would be easily abusable for falsely and inappropriate usage. The Complexity itself is caused by managing such system, controlling and moderating it within a university environment. Due to the needed limitations on the user side and the complete control at the moderating site, it has been delayed for later implementation.

In order to be able to assess the usability directly, an evaluation was carried out in parallel during the development of the “blackboard”.

Within this evaluation the RF has been mentioned to evaluate whether the participants would want a feature like that or not. The results of the evaluation, which are analysed in greater depth in the following chapters, contributed to a large extent to the finalisation of usability.

3.2. Evaluation

The evaluation was carried out with the aim of gaining initial insights into the possibility of reducing the drop-out rate with the help of the “blackboard”. As the opinions and expectations of students at Mittweida University of Applied Sciences in particular were to be recorded, a qualitative evaluation was the most suitable method for this purpose [7]. For this reason, the strategy chosen was to conduct interviews with test subjects so that a direct exchange could be established.

Selected students from the Media Management, Forensics, Media Informatics and Applied Informatics degree programmes took part in the evaluation.

Semi-structured guideline interviews were conducted to ensure a precise explanation of the questions and the associated reduction in errors. The structure is based on a guideline in which the questions are asked in an open order [8].

The interview was divided into the beginning, main section and conclusion. At the beginning, personal information such as age, degree programme and matriculation were requested in order to obtain a classification of the test subjects and their degree programmes. This was followed by the main part of the interview, which was divided into two subject areas. They specified in the main part refer on the one hand to the usability of the “blackboard” and on the other hand to the fear of failure during studies. Here, the answers should only refer to students who are afraid of failure due to the amount of study content. The respondents then had the opportunity to submit their own suggestions and improvements for the “blackboard”.

As the dropout rate was analysed in the context of Mittweida University of Applied Sciences, enrolment was mandatory in order to take part in the survey. Participants were recruited via personal contacts and social platforms. Before the interview, the participants were informed that they would have to test the “blackboard” and then answer questions. For this reason, the test subjects did not have the opportunity to respond to the questions before the interview began or to think about their answers in advance, which meant that information was collected spontaneously or after brief reflection. The interviews were deliberately conducted in person rather than digitally in order to be able to respond better to the participants’ questions and ensuring high-quality answers.

The interviews lasted between 20 and 90 minutes. No minimum or maximum duration was specified in advance during the interview. For this reason, the interviews took place in parallel with different interviewers in order to adhere to the time limit and to be able to interview as many test subjects as possible. The recordings were made via the mobile phone of the respective interviewer and in a room at Mittweida University of Applied Sciences. One interviewer and one respondent were present. A total of six questions were asked and recorded in the main part of the interview:

- How would you rate the user experience of the “blackboard”?
- How effective is the transfer of knowledge from the “blackboard” to the user?
- Can the “blackboard” help students with their studies?
- Does it help students feel more comfortable in their studies?
- Do you feel supported by the Mittweida University of Applied Sciences?

- Does the “blackboard” reduce the fear of dropping out of university?

The first two questions focussed on the user experience and the knowledge transfer process of the “blackboard”. The next questions were then used to ascertain whether the “blackboard” has a positive effect on students preventing them from dropping out. The survey is limited to students who are independently motivated to complete their studies. This limitation is intended to ensure that the “blackboard” helps those students who are willing to complete their studies with the appropriate motivation. While the test subjects were looking at the “blackboard”, they were asked to create a post and find it. Furthermore, at the beginning, the test subjects had the task of describing the benefits of the respective icons and then testing them. Throughout the entire process, they were able to comment on positive features and those that could be improved.

4. Results

A total of 35 test subjects volunteered to take part in the “blackboard” review. All subjects were between the ages of 19 and 25. Ten of the subjects were in their first or second semester during the interview, while the remaining 25 were in their third semester or higher. During the Interview, most of the participants were able to comfort themselves with the use of the “blackboard” without any problems and understood its theoretical meaningfulness and long-term effect.

The user-friendliness of the “blackboard” was rated as ‘good’ by all participants, although suggestions for improvement were made by the participants following the survey. These related to better use and visualisation, as well as the ease of understanding the “blackboard” and its handling.

The knowledge transfer process of the currently implemented “blackboard” was rated as ‘very good’ by all students. When asked whether the “blackboard” can help students with their studies, all respondents answered ‘yes’. However, it was noted that this is only the case if the “blackboard” is used sufficiently by students.

A total of 33 people stated that the “blackboard” would make them feel more comfortable in their studies. The majority of respondents justified this with the increased number of offers for help with everyday study life.

Furthermore, 30 out of 35 people stated that they felt supported by the Mittweida University of Applied Sciences. This question was also answered with the large number of offers to support their studies.

Of the 35 participating students, 32 students responded in the affirmative to whether the “blackboard” helps to reduce the fear of dropping out of university. Some respondents expressed partial agreement, although no one answered the question in the negative.

Almost every participant agreed upon the question, whether the blackboard would be in the need of a Reporting System. Only 2 students claimed that it wouldn’t be necessary, since they believe users wouldn’t do anything related to that because they are willing using this tool.

The results of the survey indicate that the “blackboard” has the potential to provide students with better support in their everyday learning and thus reduce the fear of dropping out.

5. Discussion

Looking at the results, it can be seen that the “blackboard” has already been implemented efficiently to a large extent. Despite this, further evaluations with a larger number of test subjects are required to accomplish more precise results in order to achieve a sustainable effect in terms of reducing the fear of dropping out.

Several limitations must be acknowledged. First, with approximately 5 800 students enrolled at Mittweida University of Applied Sciences, a sample of 35 participants cannot yield representative insights for every degree programme. In particular, some subjects may be over- or under-represented in this small group of test subjects. To prevent this, a larger evaluation—recruiting a differentiated sample that reflects all degree programmes and academic years—is required [9].

Second, the “blackboard” was tested only over a brief period. Short-term trials risk capturing anomalous usage patterns (for example, intensified platform activity during registration or exam phases) rather than stable, long-term behaviour. Extending the evaluation across at least one full semester would enable more precise results over the impact of the “blackboard”.

Third, the underlying methodology relied exclusively on guided, qualitative interviews. While these sessions yielded valuable user impressions and design suggestions, they do not quantify task performance or reveal unprompted usability breakdowns. Future studies should therefore incorporate additional methods—such as unmoderated usability tests, standardized surveys and A/B comparisons—to evaluate findings and identify specific interaction difficulties.

Finally, participants highlighted several quality-of-life enhancements—most notably, clearer visualizations, more prominent filter indicators, and minor stylistic refinements—that fall beyond the current feature set. Iterating on these design details and conducting rapid follow-up tests will be essential to guarantee both functional accuracy and user acceptance. The high number of media informatics students is due to the social contacts of the interviewers, as they are enrolled on the same degree program.

The interviews were transcribed after they had been conducted. It was not possible to record in a recording studio, which is why background noise can be heard in the recordings. For this reason, the transcriptions are not an extensively usable source.

In addition, the nonexistence of a fully functional backend prevented implementation of both the reporting function and the “blackboard” itself within the HSMWmobil app, which was a direct consequence of the project’s constrained timeframe. To guarantee safe, reliable usage—and to allow students to report inappropriate content, submit concerns confidentially, or request administrative support—a robust server-side infrastructure must be developed.

Future research should therefore concentrate on the complete integration of the “blackboard”, alongside its reporting function, into the HSMWmobil app. Such integration demands not only backend development but also thorough end-to-end testing across device types and operating systems. Performance benchmarks, stress testing, and failure-mode analyses will be necessary to validate system reliability under intense loads.

Beyond technical integration, promoting awareness of the “blackboard” is very important. A comprehensive marketing campaign—leveraging email newsletters, digital campus promotions, targeted social media posts, and live demonstrations during orientation sessions—should be launched well ahead of full deployment.

Peer-to-peer recommendations, facilitated through student coordinators or representative groups, can further amplify reach. Only once a major group of users engages with the “blackboard” will the platform’s network effects take hold, advancing a vibrant community in which students feel encouraged to share experiences and seek support. At the same time, the “blackboard” must be fully implemented and integrated in order to be able to conduct interviews and long-term studies in the future.

6. Conclusion

In this paper, the design, implementation, and preliminary evaluation of the “blackboard” feature within the HSMWmobil app, was developed as an opportunity to address students’ fear of dropping out. By providing a decentralized, student-driven platform for creating, discovering, and managing study groups and workshops, the “blackboard” motivates students to effectively organize and maintain their own support networks. Creators retain full control over their posts—editing and organizing them, and moderating participation—while all students benefit from intuitive navigation assistance, including a flexible tag system, multi-criteria filters, and, as currently conceptually specified, a reporting mechanism intended to maintain a productive environment. The initial field trial involved 35 participating students

who accessed the “blackboard” for the first time under real-world conditions. Despite the prototype’s underlying limitations, feedback was primarily positive: students reported enhanced visibility of peer-led learning opportunities, appreciated the simplicity of joining or creating their own posts, and expressed confidence that such interactions could reduce feelings of isolation commonly linked to dropping out. These encouraging results affirm the underlying hypothesis of this paper that a modular, scalable “blackboard”, when integrated seamlessly into an existing university app, can provide a greater sense of collaboration and academic engagement.

Looking forward, there are still ways to improve the “blackboard”. Conducting additional development iterations that focus on usage metrics and student interviews will help improve its primary components. To ensure the “blackboard” is fully accessible for every student means engaging with policymakers and IT services. Together, they can establish clear data-privacy rules and integrate the “blackboard” in the university’s official app. Additionally, the tab-based organization framework which was implemented promises intuitive future enhancements, such as the addition of new categories or administrative moderation tools, without negatively impacting maintainability. The underlying tag architecture and modular codebase are expected to minimize long-term maintenance efforts and to support effortless scalability as interest increases.

Consequently, the “blackboard” as part of the HSMWmobil app could be a supportive means of reducing the drop-out rate at Mittweida University of Applied Sciences in the long term.

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