Chapter #22

STUDENTS' AND TEACHERS" VIEW ON SCHOOL-DEPENDENT FACTORS THAT AFFECT STUDENTS' ASSESSMENT PERFORMANCE

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ABSTRACT
The paper attempts to name, define and evaluate various factors that may influence the assessment of students. The idea behind an exam for students is to determine to what extent students have learned (assimilated) the course content. The exam is also a type of summative assessment that is designed to determine whether students can select and apply effective study strategies and whether they know how to prepare for and perform during the exam.
Both scientific publications and the authors' experience show that in many situations, students do not achieve an exam result that matches OR is in line with their skills. In this chapter, the authors focus only on factors that may depend on the strategy of the university, such as stress management, examination techniques, understanding of tasks etc.
The authors collected data to investigate what kinds of study and examination strategies students use and how these strategies satisfy student assessment results using qualitative and quantitative methods. The results were used to identity which factors have the greatest impact on student performance. The chapter presents some suggestions on how schools and universities can support students to be more prepared and more aware of themselves in such situations.

Keywords: evaluation, study strategies, examination strategies, students, assessments.

1. INTRODUCTION

Defining education as only formal education is a gross oversimplification (Michalos, 2017). In today's culture, it is expected that many things will be learned in many ways and in many contexts, but the word "education" is only associated with formal education from government schools and universities. Education today needs to "*expand academic quality in all aspects, right from the curriculum to the learning-teaching process to examination and evaluation systems*" (Aithal & Kumar, 2016, p. 7). Times are changing and higher education institutions need to create a learning model that keeps the curriculum in line with the changing environment, the adoption of technology, the changing demands of industry, the changing aspirations of students and the changing expectations of society (Aithal & Kumar, 2016).

Norway is a welfare state with mostly small differences between social classes, especially in the education system. In Norway, access to education is a human right and everyone is accepted, but many of them do not complete their studies. The authors' experience shows that students learn more during the semester than what is shown on their

final assessments. By "assessment" in this chapter, the authors mean the final assessment at the end of the semester. Such an assessment may be a written or oral examination, but it may also be the submission of one or more assessments or another method that is used to assess a student in each subject. The authors' experience shows that many students who correctly respond to classes and write good papers during the semester do not achieve good results in the final exam and do not receive a well-deserved grade.

The aim of the paper, which is an extension of a previous paper (Fojcik, Fojcik, Stafsnes & Pollen, 2019a), is to identify and analyse the factors that may affect student performance on assessments, and to discuss to what extent those factors correspond with the teacher's experience and the student's comments. The authors looked for factors that do not depend on society, economic differences or gender, but on the university strategy, the preparation of teachers and the students themselves, which are the factors that can be influenced by teachers and universities to help prepare students for a better academic assessment.

In this paper, the authors will present the theoretical basis and previous research on this topic in Section 2. Section 3 will present the methodology that was used for the data sampling in this project. In Section 4, the results will be presented and commented on. In Section 5, the authors will discuss some controversy about the results and different approaches to help students improve their performance and in Section 6, they will discuss and offer conclusions from these studies.

2. BACKGROUND

2.1. Academic performance

Academic performance, which consists of much more than reading, listening or memorising facts, is the final part of learning and studying. The final method of evaluating students' knowledge and skills is a summative assessment, which means "*a judgement which encapsulates all the evidence up to a given point*" (Taras, 2005, p. 468). The purpose of such assessments is to objectively organise and rank students' knowledge and skills in each subject *via* the learning outcomes that are defined in the subject description. Nevertheless different personality traits can definitely influence student performance (Poropat, 2009).

In psychology, researchers have systematised personality traits, and the current models consist of five recurrent personality factors. Tupes and Christal classified these factors as "*surgency*", "*agreeableness*", "*dependability*" "*emotional stability*" and "*culture*" (Tupes & Christal, 1992, p. 225). The current five-factor model of personality can classify major personality traits into openness (being creative, sensible, broad-minded, open to new things and ideas), conscientiousness (being persistent, dependable, prepared, structured and having the will to achieve), extraversion (being active, social and the centre of attention), agreeableness (being reflective, cooperative, caring and friendly) and emotional stability/instability, which is also called neuroticism (often being stressed, upset, dramatic, unconfident, anxious and having adjustment issues) (Digman, 1990; Phillips, Abraham, & Bond, 2003; Poropat, 2009; Zhou, 2015).

Poropat (2009) found that there is a strong relationship between academic performance and three of those personality traits: agreeableness, conscientiousness and openness, and he argues that it is conscientiousness that has the strongest association with academic performance of all of the five-factor model dimensions. While the effect of openness on academic performance is strongly discussed, the role of conscientiousness is

also commonly acknowledged by researchers (Chamorro-Premuzic & Furnham, 2003; O'Connor & Paunonen, 2007; Phillips et al., 2003; Zhou, 2015). The research of Zhou (2015) found that students with lower levels of self-determination are more influenced by the five-factor model than students that are highly motivated and self-determined. This means that a student's motivation is not only a driving force of learning, but that it also influences a student's performance as well. Chamorro-Premuzic and Furnham (2003) discovered that there is significant negative correlation between neuroticism/emotional stability and extraversion on student performance. This means that students that are emotionally stable and introverted have a 15% greater chance to perform better in an academic examination.

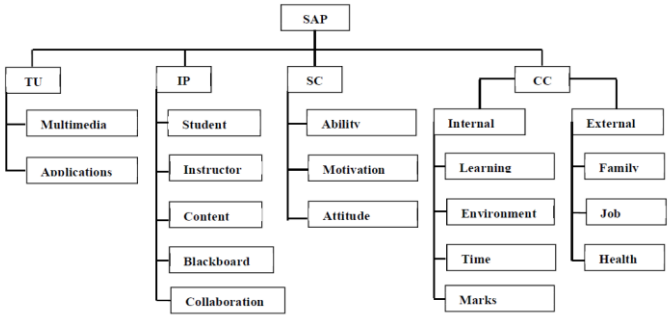
2.2. Factors that affect student performance in the literature

There are many different factors that can affect student performance on summative assessments. In literature there are already some previous studies with similar goal, to identify factors that affect student performance that this chapter is based on. One is the research of Al-Zoubi and Younes (2015), who in their research mapped and discussed the definition and causes of academic failure. In their studies, they found six internal and mental factors that can result in academic failure:

1. Lack of a Clear Plan.
2. Medical and Psychological Reasons such as:
    a. Major Depression Disorder,
    b. Generalized Anxiety Disorder,
    c. Exam Phobia,
    d. Obsessive Compulsive Disorder,
    e. Attention Disorder,
    f. Learning Disabilities and Slow Learning.
3. Reasons Related to the Learner:
    a. Lack of enthusiasm,
    b. Lack of experience and hasty in getting the results,
    c. Lack of abilities,
    d. Fear of failure
    e. Lack of self-confidence.
4. Parental and Educational Reasons.
5. Exam Anxiety.
6. Lack of Motivation for Success.

In a different study, Ismail, Mahmood and Abdelmaboud (2018) used a different way to present the factors that affect the academic performance of students, Figure 1. Their model, SAP, which stands for Students Academic Performance, is based more on the schematic structure of the main factors and subfactors. There are four main factors: TU – Use of Technology, IP – Interaction Process, SC – Student Characteristics and CC – Class Characteristics. This model analyses both the internal and external factors that can affect the learning process from the technology being used in the classroom by the teacher, to personal characteristics such as attitude and motivation. Major factors such as the environment, family and jobs are also included.

Figure 1.
Suggested factors that affect student results (Ismail et al., 2018, p. 171).



There are many ways to define the factors and many situations and variables to consider, which can act differently in different situations. The aim of this paper is to try to distinguish the factors that have the greatest impact in a small-town university college (HVL) in the STEM courses. This paper shows some practical elements that it is possible to change in an academic environment. Through a teacher's experience, an analysis of the assessment results for 12 years and feedback from the students, the authors want to elaborate on some of the factors presented above.

Research hypothesis:

It is possible to select some factors that can most affect student performance on assessment. Changing (improving) these factors would result in a visible improvement in grades.

3. METHODS

To answer the research question proposed in this study, the authors researched students with different backgrounds. Participants in this study were STEM students in different years of a Bachelor's degree programme. The data was collected using a variety of methods. The quantitative survey and examination results from pass years were statistically analysed in the paper (Fojcik, Fojcik, Stafsnes, & Pollen, 2019b). In addition to a survey, the authors wanted to interview students at several stages of their studies in order to determine whether there were differences in their study techniques, and how they reflected on their own ways of dealing with final assessments, exams and exam preparation. This chapter combines previously discussed factors with qualitative interviews in order to better understand the perspectives and behaviour of students. Combining and analysing the joined results resulted in some contradictory factors, which will be discussed in Section 5. They showed that the results from the survey and habits/teacher's experience did not always fit with the explanations that were given in the interviews.

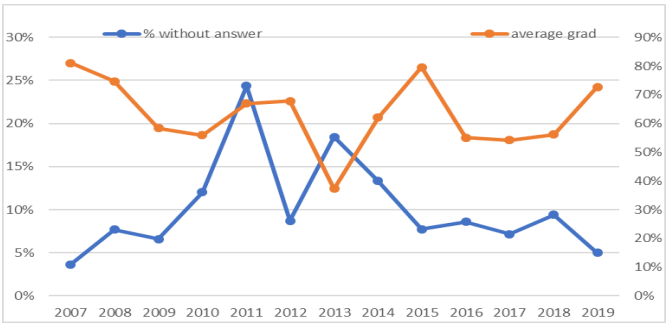
The authors interviewed 66 teachers and 44 students: four first-year students, three second-year students and two third-year students. The students were first informed about this research project through an online learning platform, then the researchers visited their classes in order to tell them more about the project and to find volunteers.

All of the data were voluntarily collected. The students agreed to the interviews and signed a statement of consent to be part of this project. Each interview was based on a semi-structured guide, which was approved by the Norwegian Centre for Research Data, NSD.

4. EXPERIENCE OF TEACHERS, STATISTICS AND SURVEY RESULTS

The authors began this project by analysing the anonymised statistics of the final assessments from the last 12 years for the 2nd-year engineering course: "*Electronic and Computers*". The teachers observed that (statistically) the students that were able to solve problems on exercises or laboratory did not even try to do so on an exam. In other words, the students' level of knowledge seemed to be higher in the exercises than in an exam. The statistics, Figure 2, show that there is a relationship between the average grades of students and the number of unanswered questions on an exam. It is clear that many students did not even try to answer all of the questions on an examination. The most significant correlations were in 2011 and 2013, which was when the teachers began to pay more attention to how to prepare students for examinations. This preparation consisted of motivational talks, sharing and discussing strategies and techniques on takin an exam and exercises on time management. After this, the students got slightly better and answered more questions on exams.

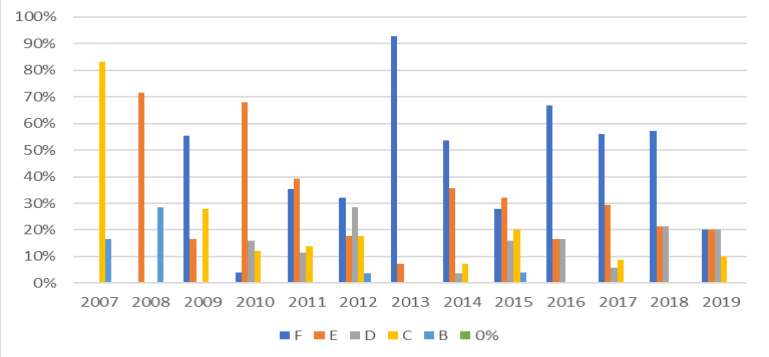
Figure 2.
Comparison of the number of unanswered questions and the average grade.



In the further analysis of the statistics, the authors found a different kind of correlation between the grade and unanswered questions. Prior to 2013, the students that did not answer some of the questions were still able to achieve better grades. After 2013, when the teachers began to address this problem, and tried to teach students not to leave questions unanswered, there were a change in the pattern and from that time the students that did not answer questions achieved low grades. Figure 3.

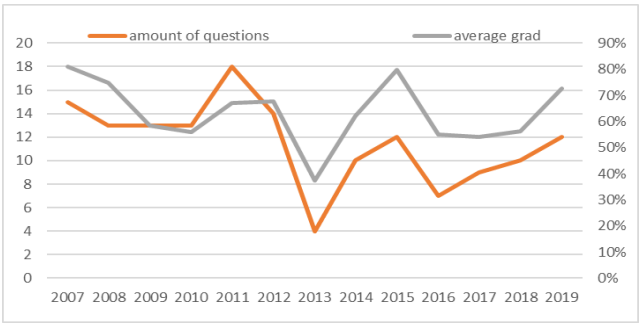
Students that received grades from F to B did not answer some of the questions on the final assessment. After 2013, this was mostly students with an F grade (Fail) that had problems with answering questions.

Figure 3.
Grades of students that did not answer all of the questions.



Another observation in the statistics was that the grade was dependent on the number of questions. If there were too few questions on an exam, the students did not perform well, which was also true if there were too many questions. This part of the analysis found that the students achieved the best average grade when there were 10-13 questions on an examination in this course, Figure 4.

Figure 4.
Number of questions versus achieved grades.

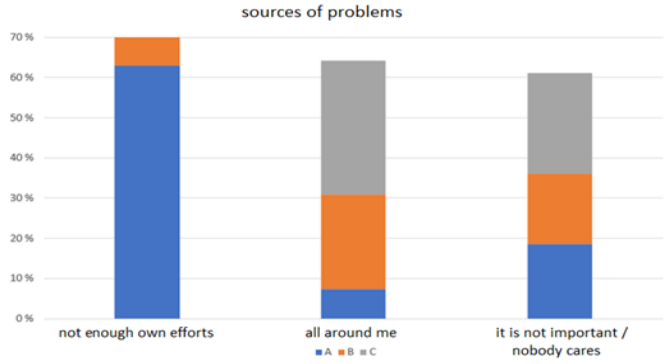


To explain this and to find the cause of this problems and any correlations, the authors conducted a survey. Students were asked about the main factors that affected their performance on an exam. The results that were obtained from the survey indicated that many factors can influence the learning and evaluation process of students. There were two clearly visible elements that affected students: stress and expectations. The biggest problem that affected students before an assessment was anxiety and stress, which was mentioned by over 60% of the students, Figure 5. This corresponded with the findings of Al-Zoubi and Younes (2015).

Figure 5.
Common problems presented in survey.

In another question the students were asked to write what grade they realistically wanted to achieve, and to give the reasons that could prevent them from reaching this goal. The analysis showed that students who expected grades above average were more critical of themselves and showed conscientiousness about their choices as well as accepting responsibility. This factor was called "Attitude" by Ismail et al. (2018). Meanwhile, students that expected to receive a passing grade or an average grade expected the learning process to be given to them – through a passive attitude, Figure 6.

Figure 6.
Reflection over desired grades and problems in achieving them.



Both of those problems were addressed during the interviews. The dialogues showed that students did not have any specific preferences/experiences and they mentioned many different things. Yet, there were some differences between first-year students and the more experienced students. There were three common factors: a student's experience with studying and learning, a student's preparation and awareness of the assessments itself and the type of exam.

4.1. Differences in students' experience

After analysing the interviews of all of the students, the authors observed that the more experience students gained in being students, the more reflective they were about

their own methods of studying, which caused their attitude to change (Ismail et al., 2018). Those students explained how several aspects of studying affected them and what they did about them. First-year students, without any studying experience, tended to do what others did without reflecting on how they should adapt to the environment. Third-year students, and also to a point second-year students in the Bachelor's degree programme were more likely not to differentiate classes, courses and the level of effort in a subject by their own motivation or personal mood but by creating good study habits and structuring their learning process. First-year students were more likely to skip early-morning classes if they were not interested in the specific topic or if they thought that they understood the topic.

Another difference between new students and experienced ones was the effort they made towards achieving the desired grade. First-year students tended to wanted to earn above-average grades and expressed a desire to achieve their goals. Third-year students tended to have goals that were related to the difficulty and complexity of an exam. They tended to be more reflective about themselves both as students and as to how they adapted to the relationship between themselves and the academic institution.

4.2. Form of the final assessment

Most participants in this project claimed to have found a method for preparing for an academic assessment that worked for them. Some students preferred to work alone, while others preferred to work in small groups with other classmates. Nearly all of the students said that they worked with practical problem-solving tasks that were related to the course and topic. Reading was not an effective way of preparing for the exams because the STEM courses are practical orientated and the students followed this orientation and mainly practiced mathematics.

Eighty-nine percent of the students argued that four- to seven-hour-long written exams were not an effective assessment method for STEM courses. Some said that a whole semester depended on one day and that if you had personal matters that put you out of mental balance, you were not able to give your best. Others said that a written exam does not represent the society or workplace of today because today you have colleagues to discuss things with and no one expects you to know everything there is to know about every topic within the engineering field. They also stated that one could get lucky with what he or she reads; one student could know only a small part of the subject, get lucky in the exam tasks and get a top grade, while another could prepare and read everything except the given task and fail. Students felt that it was often about how lucky you are with the topics and how your body and mind are on the day of an exam.

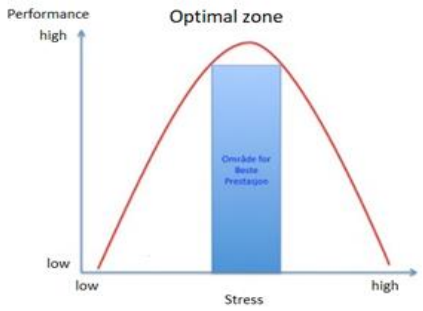
5. DISCUSSION

5.1. Anxiety and stress

The authors wanted to ask the students about the main factors on the survey in order to get the students point of view, but surprisingly, none of the students talked about real nerves and anxiety on the day of the exam. They appeared to have confidence in their exam preparation and in the fact that they had done their best to deal with the exam in the very best way they could. The only nerves or anxiety some of the students had were about what kind of questions there would be on the assessment or whether they would remember everything from the lessons. These kinds of nerves disappeared when they began to solve the exam tasks. What is interesting is that all of the students that the authors interviews mentioned that their classmates had anxieties that cause them to have a mental block during

an exam. This result is not consistent with the result of the survey, (where over 60% of the students complained about stress) and even more importantly, this result did not have a normal distribution, Figure 7.

Figure 7.
Optimal stress zone.



If the stress level is too high, it can stop logical reasoning when a student is too stressed and scared to perform, but if the stress level is too low, it can mean that this activity is not important enough for (in this case) a student, and that the student does not care about the evaluation and the final grade (Hauge & Wormnes, 2014). Al-Zoubi and Younes (2015, p. 2264) mentioned in their research that there are factors such as "Generalised Anxiety Disorder" and "Exam Phobia", which can affect students by weakening their memory and concentration both in preparing for a final assessment as well as on the assessment itself.

5.2. The duration of exam (lack of time)

The second problem the students commented on in the interviews was about the duration of the exam. In both the surveys and interviews, the students expressed concerns about not having enough time to take the exam. This factor was also mentioned by Ismail et al. (2018). The students stated that they sometimes felt that they would not have enough time to answer all of the questions. There were students from different study programmes and therefore they had different assessments in different courses, which were mainly written exams that lasted for three to six hours. Nevertheless, most of the students wanted to have more time to write the answers. The authors observed some activity during one of the exams. About 80% of the students left the examination room before the examination time was over. The exam results showed that 34% of the students had one (17% of the students) or more (17% of the students) unanswered questions, which means that the students had the time to stay longer to finish the examination and answer the questions, but for some reason, they did not try to answer some of the questions and left the exam early.

6. DISCUSSION AND CONCLUSIONS

The authors goal with this project was to help and support students in learning and preparing for an academic assessment. The aim of this project was to identify and to eliminate, correct or improve the internal and external factors that can affect student performance and their results on final summative assessments. As a result of the research, the authors believe that there are more elements than subject knowledge that affect student assessments. These additional elements include stress, lack of time, lack of motivation, lack of information and experience in exam preparation and test-taking techniques. While it is not possible to solve all of these problems, by continuously providing students with information, motivation and explanations, it is possible to improve the levels of achievement.

Because this study was limited to the STEM courses in a Bachelor's degree programme, it would be difficult to generalise the findings from this research. In education it is important to remember that every student is different, every subject is different, every assessment and every exam is different, but this project showed some tendencies that teachers and institutions should consider when preparing future students for their final assessments.

Being a student means much more than just performing well on academic assessments. It is the time to try new things, gain experience and discover new experiences, go on an exchange to a different country and learn about another culture as well as to find out more about themselves, discover their strengths and weaknesses and grow up. Education is not limited to a Bachelor's degree (Michalos, 2017). Personality traits such as striving to achieve, self-discipline and activity affects student examination performance in at least 30% of the known cases (Chamorro-Premuzic & Furnham, 2003). Furthermore, knowledge about the factors that can influence student performance can compensate for any known or unknown weaknesses and nurture a student's strengths (O'Connor & Paunonen, 2007).

Our research indicates that there is a correlation between a student's study strategies and consciousness on their academic performance. A student's performance on objective academic assessments is influenced by their learning style, while applying that knowledge in real-life situations requires additional skills (Lynch, Woelfl, Steele, & Hanssen, 1998). Student in this research complained that the most used form of assessment in Norway is a four- to seven-hour-long written examination, a form that does not reflect the current situation in working life. Moreover, the students felt that the expectations of examinations are too high, but that very few teachers use their lessons to teach about different study techniques or different ways to prepare for final assessments in order to perform at one's best.

An assessment or examination at the end of the semester is the final, and sometimes only, chance to prove one's knowledge in a subject. Usually, there are not many occasions on which students can show what they have learned and what they can do with that knowledge. In Fojcik et al. (2019b), it is presented that the level of stress before an assessment should be distributed on a normal distribution model. This means that it is optimal for students to be in a mediate stress level during an evaluation, so that their body and mind can focus to enable them to be able to perform at their best. One may say that students that are not stressed at all simply do not care enough to perform well. In our interviews, the students did not mention any influence of stress or anxiety, neither positive nor negative. A possible explanation is that the word stress may be associated with anxiety and choking under pressure, which those students do not experience. Another reason may

be that the students did not remember the stress after the exams, when they learned that they had passed and that those positive feelings could overshadow the previous negative ones.

It is important to remember that learning is a process and that students need to be constantly reminded of the purpose of what they are learning and motivated to keep on working as well as being conscious of the whole learning and performing process. Small activities such as providing explanations or information, motivation or social inclusion are important, especially for new students.

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