

# Feedback perceptions: preliminary analysis of semi-structured group interviews with first-year bachelor students of Computer Science

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**Abstract**— This full paper reports on research into feedback perceptions. In recent years enrolment in Engineering Education went up and the number of international students increased, leading to larger classes and greater variety in prior education within the classroom. Literature review reveals large classes lead to fewer opportunities for students to interact with their teachers and receive high quality formative feedback. Feedback helps students to reflect on the quality of their work. Engineering Education is characterized by overloaded, heavily scaffolded curricula, and learning activities; it is paramount to provide students with feedback they perceive as useful and meaningful. The larger diversity in the classroom means there is a larger diversity in *feedback perceptions* that needs to be taken into account when providing feedback. In this work we present the preliminary outcomes of a study that was informed by the following research question: How do first-year bachelor students perceive feedback? We performed multiple semi-structured interviews with 17 first-year students in computer science during their first semester, and aimed to collect data on the students' lived experiences and the spread of student realities, using a phenomenological approach.

The preliminary results show that there are many essential aspects that influence students' feedback perceptions. Study shows that such aspects as large class and relationships with teacher play very important role in developing certain feedback perceptions amongst students.

**Keywords** — *feedback perceptions, computer science, large classes, diversity, engineering education*

## I. INTRODUCTION

Feedback is an important part of the learning process and has been studied intensively over the past decades. As a result, there is a large body of knowledge available to researchers and practitioners on ways of making feedback more effective for learners [1]–[3].

However, literature suggests that teachers and students might have dissimilar experiences of what is considered “effective feedback” [4], [5]. One of the reasons is that quite often teachers and students have different *feedback perceptions* [6].

In recent years the number of students pursuing a degree in engineering increases rapidly [7] also in Delft University of Technology. In 2018, the enrolment of first-year students in Computer Science at Delft University of technology almost quadrupled, from 200 to 800 students [7]. Neither faculty nor students were ready for such changes. As of 2019, a

selection procedure *numerus fixus* was introduced to cap enrolment. This selection procedure consists of three different parts needed to be completed by all applicants: non-cognitive skills assessment; cognitive skills test and self-reflection assessment. However, even with the max cap, the classes at Computer Science are still large: over 500 students. This creates a challenge for the program to provide students with effective feedback.

We decided to study the student needs for feedback from a *feedback perception perspective* to gain more understanding of what type of feedback the students would benefit most from. In this paper we present our preliminary findings.

## II. LITERATURE REVIEW

### A. Conceptualizing feedback perceptions

According to De Kleijn [8:1014] feedback perceptions are: “...thus concerned with how a learner perceives feedback, which is assumed to be influenced by the feedback message, characteristics of the feedback provider and the frame of reference of the feedback receiver.”

Feedback perceptions are very individual; however, they are the main cognitive constructs that guide such processes as achieving learning outcomes and constant learning improvement [5], [9]–[11].

There is an extensive body of literature on feedback and feedback perceptions. Studies tend to focus on both students' and teachers' perspectives: several authors explored whether students' and teachers' feedback perceptions aligned [9], [10]. Other studies focused on what students define as “effective feedback” [5], [11], [12]. Despite substantial literature on feedback perceptions, there is a gap in how feedback perceptions are conceptualized: very few studies provide explicit definitions of feedback perceptions.

Understanding how students perceive feedback can facilitate designing such feedback practices and interventions that would be beneficial in terms of improving learning and achieving academic success.

### B. Feedback perceptions in large classes in engineering

Following the feedback perceptions' definition by De Kleijn [8], every learner has very unique feedback perceptions based on multiple aspects, including internal factors: student's prior experience in feedback, perception of what constitutes positive and negative feedback; and external

factors: such as learning environment, and interactions with fellow students, instructors, teaching assistants, friends and even roommates.

Taking into account a learning environment such as engineering, large classes might be a very important issue [13]. Knowledge in engineering education is strongly scaffolded [12], [14], [15] and on average, students in engineering spend more hours studying compared to students in non-STEM field [16]. Therefore, it is essential for students to receive feedback that helps them to evaluate whether they have mastered new skills.

Many studies show that due to the increasing class size, there is a wider variety of students' prior education, cultural backgrounds, age, gender and other personal attributes [3], [17], however, it is not necessarily true for every large class. Literature suggests that large classes limit possibilities for students to receive high-quality targeted feedback from a teacher [3], [18], [19]. Teachers are unable to devote enough time to every student due to the class size, which according to [18] leads to anonymity, passivity, poor engagement with course content and low motivation amongst students. Students are less willing to seek help.

### C. Social interactions in large classes

Another important aspect that according to the definition by De Kleijn [8], impacts students' feedback perceptions are social interactions. This is supported by Mulryan-Kyne [3] and Feldman [20] who state that interactions between students and teacher are essential to let students feel comfortable in the learning environment. Authors [3], [20] suggest that as a class size increases, ratings of the course and the instructor declined slightly, and ratings of interactions and relationships between teachers and students declined dramatically [20]–[22].

However, difficulties in interactions between teachers and students is not caused by the context of a large class only. Another important aspect that influences students' engagement with the course and motivation is their experience of a new learning environment [11].

### D. Overall experience of a new learning environment

According to Hodgson [23], the transition from secondary to higher education is a crucial period for students. During transition time students need to prepare for university and to acquire certain skills for their future careers. During their studies at university, students should be able to develop confidence, and become autonomous and sophisticated learners [5], [23]. Feedback is instrumental to support this entire process of transition and for all students to reach the required levels of knowledge and skills.

## III. METHOD

### A. Collecting data on feedback perceptions

The data was collected from undergraduate students of Computer Science program during their first semester. The aim was to explore what feedback perceptions first-year bachelor students have. Therefore, the main research question was as follows:

*RQ1. How do first-year bachelor students perceive feedback?*

Our focus was on first-year bachelor students, because the transition from secondary to higher education is a time when a lot of high-potential students drop out if they do not manage to make the transition successfully [5], [24].

We administered semi-structured group interviews with 17 undergraduates during their first semester: 4 females and 13 males with different educational and cultural backgrounds and age. Interviews were held in the beginning, in the middle and at the end of the first semester. This way we captured the full experience as students started their coursework, progressed and prepared for their first exams. Although we touched on the same topics in every interview, the guide was adjusted to reflect on their progression in the coursework.

In total, 19 group interviews took place: 11 group interviews in the beginning of the first semester; 6 group interviews in middle; 2 group interviews in the end of the first semester. All students participated in the interviews voluntarily. Interviews were organized during lunch breaks so they would not interfere with classwork. All participants were offered free lunch during the interviews.

This study was approved by the TU Delft Human Research Committee. The researchers in the team had no responsibilities in the Computer Science program under study nor do they have any formal relation with the Computer Science program.

### B. Instrument

Since the concept of understanding students' perceptions of feedback is not new, many researchers and educators have tried to collect data on *what* students want in terms of feedback [25], [26]. For that purpose, standardized evaluation questionnaires are used often. These instruments tend to measure frequency, quality and amount of feedback provided for a specific course or a particular moment of time; while learning process itself is often overlooked [27]. As a result, such evaluative questionnaires represent attributes of the quality of a learning environment, but not necessarily the quality of learning that has taken place. For our study we chose semi-structured group interviews instead. We believe that exactly engaging into a conversation with students, helps us to create a better understanding on their feedback perceptions. Therefore, this approach is unique, and provides with a deeper understanding of what students actually mean when they try to define feedback, its purpose, usefulness and application.

Group interviews provide participants enough time and options to discuss their experiences and share their visions with each other [6], [28]. According to Krueger [28:255]: *"...group interviews can capture the dynamic nature of group interactions and create social contexts that are more natural to respondents than individual interviews"*. The aim of the interviews was to explore students' perceptions of feedback within a large class setting. Interview questions were therefore divided into three topics that are directly related to feedback perceptions and finished with a broader question to explore the context as a whole:

1. Large class: how do students feel in their new learning environment; what do they consider positive and negative aspects of a large group; how do they feel in a large class and whether their feelings change overtime; students' ability and inability to ask help;

2. Feedback: what students think feedback is; their understanding of “negative” and “positive” feedback; whether they use feedback for learning and *how*; students’ experience of feedback which was opposite to their expectations;
3. Social interactions regarding feedback: interactions with lecturers; interactions with fellow students or peers; help and support from Teaching Assistants; interactions with friends or house mates; students’ strategies to overcome difficulties in learning– if any;
4. Overall experience of studying in a new learning environment: for this research, it was important for us to give students a possibility to tell us how they experience their new learning environment: what they liked about it and what were they missing; challenges and difficulties that students faced; strategies they find useful; students’ definition of a successful student; students’ comments and suggestions to educators

### C. Research design

Since the main purpose is to focus on *what* students see as feedback and *how* is it perceived by individuals and by the group in general, the researchers chose a phenomenological approach this study. Phenomenology allows the researcher describe “...*what all individuals have in common as they experience a ‘phenomenon’*” [29]. In this case, group interviews allowed us to get insight in lived experiences right at the time of collecting data. However, this is also one of the disadvantages of group interviews. According to Park [30], the phenomenon of ‘group think’ can occur – people in a group tend to agree with each other even if they initially reported different experiences and thoughts. To lower the chance of group think occurring, we decided to do semi-structured interviews – removing strict structure of the process gave the researcher an ability to interact with individuals while limiting interference with the group dynamic.

### D. Analysis

All interviews were transcribed verbatim and were analyzed as a single data set. To maintain reliability of this study, the research team and an external researcher, familiar with data analysis, were involved in checking and recognizing codes.

The qualitative analysis software package ATLAS.Ti was used to analyze the transcripts. All identifying information was removed from the transcripts.

The first round of analysis and coding was done by the first author of this paper. As suggested by Miles & Huberman [2], the researcher began with four overarching, generic codes, derived from the literature review, and continued exploring the data with more detailed codes that were created as analysis progressed. The entire process of coding and analysis was monitored and checked by other member of research team – the second author of this study. After that, Author 1 engaged into *in vivo* coding.

Preferably, each fragment would have a single code only, however, some fragments have references that apply to multiple codes and were therefore assigned multiple codes.

## IV. FINDINGS

We present the findings below, clustering results under the broad codes we used for initial coding.

### A. Large class

Students were asked to reflect on their transition from secondary school to university in terms of class size, specifically about their feelings, emotions and perceptions of the large group they are part of. We identified three perspectives:

1. Large class as an advantage: several students state that they feel comfortable and positive in a large class. In their opinion, large class provided them with a lot of possibility to mingle with their new class mates, find people with common interests, feel motivated by others, find new friends: “...*a lot of people, a lot of minds... you can always get to know new people.*” Some of these students are surprised that the class atmosphere is friendly.

Students also like the fact that due to such large numbers of students attending the lecture, the teacher rarely puts attention to the ones who leave the class or are doing other things, like playing games on their phones or chatting with their friends. For those students, anonymity in large class is definitely an advantage. Students say particular phrase: “...*You are not being watched...*” quite often during the interview.

One student has decided to skip certain lectures and has done it during the entire semester. On the question *why?* He says that he gets the same feeling of just watching a recorded lecture if he sits at the back. He thinks studying in a large class is an advantage: “...*if I don’t show up, they don’t care, or if I am not there, I will not be missed...I think that’s great...*”

Two female students state that the biggest benefit of a large class is that it provides you with independence, autonomy in your own learning: “...*you are treated like an adult – given responsibility and independence...*”. Next to that, they think that in a big group someone might ask questions that you [students themselves] are not aware of, which is also considered a benefit of a large class according to some of students.

2. Large class: neutral attitude. Few students claim they felt nothing in relation to a large class. Two of them started their bachelor program for the second time, therefore have already experienced studying in a large group. Others could not specify any special feelings or emotions to the fact that they are studying together with other 500 new people.

When prompted they struggled finding advantages and disadvantages of studying in a large class, stating they never thought about it before. There were a lot of doubts amongst those students about how they feel in a large class. Common phrases were: “...*I don’t care*”, “...*I don’t know...*” and “...*I guess...*”.

3. Large class as a disadvantage: the majority of students consider studying in a large group a big disadvantage. Mostly female students experience negative attitude towards large classes. They interpret teacher’s behavior as follows: “...*in the lectures it’s like they [teachers] don’t want you to ask questions...*”

Another negative aspect of a large class is that due to the fact that Delft University of Technology is not prepared to host all 500+ students in one auditorium, all lectures take place in the Conference Centre – the largest auditorium on campus. Since this specific place is not designed for lectures, students face difficulties adapting to this learning environment. A lot of negative comments are about physical attributes of the auditorium, such as, for example, lack of tables or surfaces to write on, lack of appropriate lightning. Students conclude that all those characteristics make it more difficult to focus: “....so it kind of makes you more prone to zone out...”.

Most of students mention that large classes make them feel intimidated by their size: feeling invisible, feeling lonely, feeling stupid, feeling scared – those feelings are mentioned most of the time. Mostly female students describe strong fears related to large class: “*I feel scared because I think that they [teacher and other students] would think that I am stupid...or I am not up to date or something...*” or: “*It's just like...500 people are staring at you, like, what is she asking...that kind of feeling just scares me - so I do not dare to ask questions...*”.

Following statement is repeated very often through the entire study by multiple students: “*I just don't want to disrupt the lecture...*”. Students state they do not really ask questions, even if something stays unclear.

When the interviewer met students for second and third time, some more information was shared via interviews. Mostly, students mention feeling unseen in the large class and: “*...just a part of something huge...*”. Some of the students mention that they got used to the amount of people in the class. Others mention that with time, fewer students come to lectures. Several students expect fewer students to complete their BSA (minimum number of credits necessary to enroll in the second year of study, for Delft University of Technology it is minimum of 45 out of 60 credits by the end of the year).

As the semester progresses the majority of students conclude that atmosphere in the classroom depends on number of students attending the lecture. They suggest that when they study in smaller groups, they [students] have more appropriate atmosphere for learning since it is less distracting.

Majority of students mention that contrary to the Conference Centre, smaller groups are often placed in different classrooms which have all the facilities that students require, such as tables, appropriate lighting, chairs.

A major difference in class atmosphere that students mention as the semester progresses, is that everybody made more friends.

## B. Feedback

The students' perceptions about what a feedback is, can be divided into two categories: feedback perceptions and feedback purpose.

### 1) Feedback perceptions

In terms of Feedback perceptions, students mostly use such words as: *information, opinion, advice*.

Talking about perceptions, students mostly base their understanding of feedback on previous experiences, which, in most of the cases, means secondary school learning environment. In this case, their feedback perceptions are closely connected with how their relationships with secondary school teacher were. From students' answers it was clear, that relationships with their [students] secondary school teacher play big role in how students perceive feedback. According to students, when having good relationships with a teacher, a student would most likely see feedback as ‘fair’. And on the contrary – when relationships with teacher were not so good, a student would most likely ignore feedback and think it is ‘not fair’: “*....it depends how feedback is given...because if someone is, like, all negative about what I did and not constructed – I just ignore him. Yeah, I would not care about it...*”.

Since students have little to none experience with feedback at university, they mostly talk about what they expect feedback to be, what they think is useful feedback. According to their expectations, a useful feedback contains detailed examples. An important note here from the students is that those examples should be the same difficulty level as the ones that appear to be on exam. Several students state they require more step-by-step guidance.

### 2) Feedback purpose

Some of students describe feedback based on its purpose. Most commonly used words in this case are: *improvement, suggestion, evaluation, help, critics, learning* as a purpose of feedback was mentioned by only 1 student.

Few students struggled formulating their understanding of feedback and could not answer the question, however they stated that feedback can be *positive* [3 students] and *negative* [3 students].

An interesting conclusion emerged from the way how students formulated their understanding of feedback – none of the students assumed that feedback can be generated internally; all students assumed that feedback is per se provided by teacher or someone else: “*External help, external evaluation.*”; “*Usually comes in the form of suggestion or advice.*”; “*...to give me advice for things I do wrong or right.*”

Since all participants are first-year bachelor students in their first semester, most of their experience with feedback comes from secondary school. In their discussions about feedback, students move back and forth from secondary school to university, comparing these two learning environments in terms of feedback they receive.

Most of students say they use feedback that is provided to them; few students tend to ignore feedback, as far as they get a ‘pass’. On a question *why [do students ignore it]*, they say that feedback that they receive in secondary school is mostly grades, which in their opinion have little value.

When asked about what do they do with feedback they receive, most students would first focus on “*negative*” feedback. By “*negative*” feedback students suggest comments from teacher [university] or teaching assistants [university] that can be harsh, mentioning flaws in students' work, offending students' feelings. In general, students would find this feedback less pleasant, however, the most efficient for learning: “*...it aims towards improving stuff and usually is not always good, and some people get offended by*

*it, although it's purely constructive feedback, I mean, you should learn from it, not take offense at it...*"

However, as mentioned by few students, they would not want to receive only feedback which is constructive. From their words, "negative" feedback only is no use because it only shows what is done wrong, but doesn't give them a chance to discover how to do it right.

When asked about "positive" feedback and its application for learning, several students say that they [students] see it as an indicator that they are on the right track. Only few of students would ask for more feedback or extra study.

In general, students had quite positive attitude towards feedback, seeing it as something that helps them improve. However, when asked to provide an example of how do students actually apply it for their learning at university, most of students hesitated to answer or could not answer at all. According to students, most of the time feedback consists of grades which indicate how well you know the material – at the same time makes it difficult to improve, since it only shows the flaws. That conflicts with students' statements that they use feedback provided to them.

### C. Interactions

In terms of interactions, university and secondary school were discussed as two distinct learning environments. Both experiences were compared in terms of teacher – student and student – student interactions.

Based on comparisons between the two, there were five main actors identified in terms of interactions: fellow students; teacher [university]; teaching assistants [university]; friends and roommates; teacher [secondary school]. Most of the interviewed students had experience interacting with all five actors.

When talking about teacher – student communications, many students concluded that there is certainly less personal connection at the university. However, students see it as an attribute of a large class. Some students say: "Well, yeah, like I said earlier, like, less personal. Like it is more, like, big group – I[teacher] do not know any of you, but I[teacher] just...talk..."; or the following statement: "I feel like...interaction between the professor and students is obviously less here."

Most of students state that they miss more personal connections with their teacher, by giving examples of how it was at their secondary school and comparing it to the situation at the university: "We had small classes of 24 students each approximately. And the advantage of that was that the teacher was very, like, focused on issues. Right. They knew the strengths and weaknesses of each student. They could help them and catered them to their needs. Now it is more independent...the professor does this thing, and if you get it, you get it. He cannot, kind of, help you out, as much as there are 500 of us, of course. So that's my only problem. I feel like now it's not so focused..."

Some students agree that having a less personal connection with the teacher makes it difficult to seek help or ask questions: "...if I feel that I have more personal connection [with a teacher], then I can easily ask them what is on my mind...and with that, I am too scared at the moment to even get close to the teacher."

When asked about what kind of interactions the students expect, many answers were similar to the following: "... [in secondary school] we would get feedback on things like – how you should approach the problem, which is what I was kind of missing out [at university]. ... Now I kind of try to figure out the way or sort of approach [for] the problem, which I am not really getting that right now. I want to be able to distinguish between ...this problem - I know I have to do this and this, but right now I am in the gray zone..."

A lot of students say there is a clear difference between teachers in secondary school and teachers at university. According to students, you can only approach teacher during the lecture or in between the break. Several students tried to approach teachers after lectures but did not succeed: "I mean you do not really see the teacher outside the lecture...so it is like... they vanish..."; "I mean, you could probably go talk to them[teachers] if you know where they are...but you don't know where they are..."

In the beginning of semester, teaching assistants are students' main source of feedback, answers, help on any matter.

Students claim that in contrast with university teachers, teaching assistants are easier to approach in case of a difficulty: "The TA[teaching assistant] represents the lecture more than the teacher because the TA is someone who is slightly older than you[student] and he has slightly more experience so he knows what you are going through and what you need and what you don't understand, and lecturer is just someone who is some guy or some woman who knows a lot about it and just tell you all the material...". At the same time, students argue about advantages and disadvantages of having teaching assistants: some students say that several courses need way more teaching assistants that they have at the moment; others argue that number of teaching assistants is fine, but their level of competence is actually lower than students hoped for.

All students agreed on the fact that although teaching assistants are very helpful and easy to approach, the biggest disadvantage is that they are very busy and quite often not competent in the area that students need help in. Some of students give explicit examples: "...so I had a question and he [teaching assistant] was not able to answer it so he had to forward it and it took a long time. So, I did not want to ask questions to TAs because it took them too long to answer...so I asked my questions at 2 p.m. and I got an answer at around half 3.30 p.m. or something...like...then I would sit there for two hours doing nothing..."

Another example illustrates two opposite experiences that students got when asked teaching assistant to help:

- Student 1: "...they [teaching assistants] always try to explain it on a conceptual level...and I get it - you want people to get it on conceptual level...but if you are explaining JAVA programming, you cannot do anything on a conceptual level...and he was talking like...stuff and I never heard of it...and how am I going to implement it if I do not even know what you are writing...at least...so...he could have just said how it was done...and then no need to describe it..."
- Student 2: "...they [teaching assistants] give you less guidance – like step by step what to do, and because of that – when I am stuck and I want to call a teaching assistant, I do not know what to ask...like, what is the

*next step? But then they are just going to do an assignment for me...and you sit there, like – am I doing this right...and they are, like – yeah, looks good, and you are like – cool...what exactly?”.*

All interviewed students used help of teaching assistants at least once. However, only few of students continued to do so as the semester progressed.

From the interviews it was clear that as students' progress through their studies and make more friends, they tend to ask help from friends rather than teachers or TAs. Some students also mention free online resources, like field-related forums, where they can ask questions.

#### D. Overall experience

All of the students had many comments, suggestions or complaints. Foreign students experienced homesickness, and feeling alone. The majority of students felt overwhelmed with the study load, the pace of the lectures, and the number of students in the class. According to the students, feeling overwhelmed comes from a lack of guidance, and a lack of clarity on how to prioritize or plan certain study activities: *“we are overwhelmed, we got assembly, tests, we got peer feedback for which we need to do exercises from the book, we review each other exercises, we also have to read each other's exams... so we have this stuff to do and sometimes it's not obvious where we should be doing that peer feedback, or the assignments and stuff like that, because for peer feedback there is only one deadline, which is at the end of the term...so...I kind of skip this part and focus on straight feedback...I never know exactly where should I focus on...”*. Other students agree: *“I kind of find it difficult with time-management.”* and: *“Sometimes i feel a little bit overwhelmed...every time they [teachers] ask us to do anything I need help prioritizing what we should get done...”*

The majority of students concluded that they have difficulties with planning, prioritizing, sticking to the schedule and keeping on track. Those difficulties impact students' mental wellbeing and result in feeling overwhelmed and stressed. Students who do plan their studies, tend to give up their schedules when they face difficulties completing them.

Students reflected on their own motivation, which would be almost entirely external. One student says: *“I knew I would not aim high as before but I did not know I would just literally be aiming to pass...and then I am, like, happy with it.”* Another one explains what motivates her: *“Whenever I would get a good grade it would also motivate me. Because of the fact that it was good would motivate me that what I did was worth it”*. Sometimes, motivation came from unexpected sources: *“...so far, my only motivation is like searching Computer Science job and there is a lot of money, yeah, seriously that is like really high wage...so that is my only motivation...I don't know if it is good or bad”*.

### V. DISCUSSION AND CONCLUSION

#### A. Discussion

The aim of this study was to explore how first-year bachelor students perceive feedback. In total, 17 students participated in semi-structured group interviews which took place during the first semester. There were 4 females and 13 males interviewed. All students were in the beginning of their

study of programme of Computer Science at Delft University of Technology. All students who participated in the interviews study in the same class of little over 500 people.

We started with what students understand as feedback, and tried to explore some of the aspects that may influence those understandings. During the interviews, several topics related to feedback were discussed with students. Specifically: large class learning environment; feedback; interactions; and overall experience. Students gave their explicit opinions on each of the topics and shared their experiences with each other and the interviewer. Preliminary findings show that the majority of students see large class as a disadvantage. Such feelings as feeling unseen, anxious, scared, or anonymous were attributed to the large class learning environment by most of the students. Both Biggs [18] and Mulryan-Kyne [3] state that large classes result in passivity and lack of motivation amongst students. During the interviews, majority of students complained about having difficulty finding motivation to study. Several sources of motivation they specified were:

1. passing the course for the sake of ‘passing’;
2. receiving a good grade;
3. exploring future possible salaries in the field.

However, according to other students, the lack of motivation is the result of study load and level of difficulty of the course, and not a large class as a learning environment. Several students mention that they do experience difficulty focusing on lectures and sometimes lose their focus. Following the interviews, this behavior is linked to the physical attributes of the classroom, such as lack of tables, poor lighting and uncomfortable chairs. In some cases, women seemed to bring forward different answers that their male colleagues and in the next phase of the analysis the researcher wants to take a closer look at this. Women mentioned that large number of fellow students makes it hard to ask questions. They experience fear of looking stupid in front of other 500 people. Male students did not express any concerns about this matter for some reason. However, the men admitted that they experience a very wide variety of prior knowledge in the classroom, and explained their reason of not asking questions: since the pace of the lecture is very high and stable, students do not want to disrupt the flow, even if they do not understand something.

Talking about feedback, the preliminary results showed that students know and understand the importance of feedback in terms of improving their own learning, however they rarely actually use it as such. Students were asked whether they use feedback that they receive. Most of the times students would answer that they do use feedback that they receive. Next, the interviewer asked to give an example of how do students use feedback for their learning. Majority of students could not give an example. They argued that the only feedback they receive is grades, therefore they could not answer this question. This situation created a feeling that either students did not understand a question, or did not understand what ‘using feedback for learning’ means.

In their discussions about feedback, students relied strongly on their previous experience with feedback: secondary school. Students attempted to reflect on their previous experience with feedback in secondary school and drew the conclusion that depending on their relationships with a teacher they would actually consider feedback ‘fair’ or

‘not fair’. Students specify that having good relationships with a teacher can result seeing feedback as ‘fair’, while having bad relationships with a teacher results in seeing feedback provided by the same teacher as ‘not fair’. Those conclusions align with feedback perceptions definition by De Kleijn [8], who states that feedback perceptions can be influenced by certain aspects, and characteristics of a feedback provider is one of them.

According to several studies [20]–[22], as a class size increases, students’ lose personal connections with the teacher. From the interviews with students, we see that there is certainly less of a personal connection between students and teacher. The majority of students stated that they miss more personal connections with teachers like they had with their secondary school teachers. However, they suggested it might not be possible at university. Students themselves name several reasons for that:

1. Class size: all students who were interviewed agreed on a fact that large class makes it difficult for teacher to have interaction with students. They argue that some teachers try to make lectures more interactive, however, students’ role in those interactions is mostly passive.
2. Time constraints. Students specify that the pace of the lectures is usually very high, meaning there is less room for questions, dialogues or communication. One student reflects: “...they [teachers] try to make it [communication] two-sided, but it is mostly one-sided...”. Majority of students agrees that since there is a large amount of information to be transferred by means of lectures, teachers simply do not have time for other activities.
3. Teachers’ perceptions. Most of the students have their own perceptions about university teachers. All interviewees tried to compare their secondary school teachers to university teachers. Students concluded that at the university level teachers’ main goal is to transfer knowledge, therefore no student expected to have similar relationships with teachers as they had in secondary school. Students concluded that there is a distance between teacher and students. For several interviewees this distance is so intimidating that they would not even come close to a teacher physically.

From the analysis of the interviews, it is clear that having personal connections with a teacher helps students to feel more comfortable in the class to ask questions or seek help.

Teaching assistants are considered easier to approach. All of the interviewed students, in one way or another, interacted with teaching assistants. Although most of the time students had good experiences with teaching assistants, there were several complaints. According to the students, most of the time teaching assistants either do not know how to help or do not do it properly, as expected by a student, namely:

1. Teaching assistants take too much time answering students’ questions
2. Teaching assistants tend to do assignments for the students instead of guiding them through
3. Teaching assistants tend to offer complex conceptual explanations when unnecessary

According to students, fellow students and internet are most popular sources to get help, answer to a question or solution to a problem.

Several studies [5], [23] show the importance of students, transitioning from secondary school to university, to receive high-quality continuous feedback. According to the studies [5], [23] this process will help students to become independent learners. All the students who were interviewed had troubles planning their study activities and sticking to the plan. In addition, majority of students experienced difficulties prioritizing assignments. Students themselves attribute these challenges to feeling overwhelmed. According to them, there are several reasons to have this feeling:

1. Pressure of the study load
2. Complexity of the programme
3. High pace of the lectures
4. Large number of students in the class
5. Feeling homesick
6. Lack of guidance from teaching staff

Especially the lack of guidance received a lot of students’ attention. The students had many suggestions, advice and very specific details on what exactly they need from teachers and teaching assistants.

In addition, students reflected on their own ways to get motivated to continue their studies. According to the students, the main aspects of motivation are good grades, passing the course and high salaries in Computer Science field. Some students engaged in self-reflection and were surprised with how in reality they just agree on a ‘pass’, while they [students] expected to strike for a higher grade before.

### B. Limitations

A number of following factors limit generalizability of results of this study: this study included a relatively small number of students from a specific program in a single institution in the Netherlands. Participation was voluntary and, as the study progressed, a lot of students stopped responding to our invitations for group interviews. We intentionally tried to sample for a maximum variation in student backgrounds, yet we are unsure if we managed to retain this diversity in later interviews.

### C. Future directions

For the next round of analysis, there are several aims to reach:

1. There were several situations during interview where the women gave distinctly different answers than the men, therefore more research is needed to take a closer look at that matter. The numbers are small, yet it is still important to check for potential patterns.
2. The entire data collected was analyzed as a single dataset, yet there were three rounds of interviews with notable periods of time in between – 4-6 weeks in between each round. It is important to see if there are significant changes that influence students’ perceptions overtime.

This study shows importance of understanding feedback perceptions in general by providing a new perspective for feedback in higher education. Preliminary findings that are discussed in this study are indicative of the importance of feedback perceptions, however, more study would be beneficial. Future research should also study how feedback perceptions change over time as students’ progress in their learning. As with much of qualitative research, the results

here depend almost entirely on the research team, approach to analyze the data, a moment of data collection and instrument which was chosen to collect data. It is paramount that future studies include quantitative approaches to triangulate the results of studies like ours.

#### D. Conclusions

We established that feedback perceptions provide us with a new viewpoint to feedback and that it is useful for the field to continue to study this.

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