

# The Effect of Being a Teacher's Assistant on a Student's Education

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## Abstract

Teaching Assistants (TAs) are students who have done a course and are then employed by the university to return and aid the professor with the course. TAs are still students while aiding in the classroom. Their role both as students and teachers influences their education. To understand this influence, the TA's perception of the effect on their education is assessed. Based on this assessment, best- and worst-case scenarios are created. These scenarios form a basis for advice to increase the positive effects on a TA's education.

Literature research was carried out to find what effects were already known. An increase in knowledge and skills related to teaching and soft skills as common positive effects were found. Common negative effects were an increase in stress and issues related to balancing TA work with student tasks. Fieldwork was done by visiting a symposium on TA education in the Netherlands. Additionally, a TA training was followed to gain an understanding of the skills TAs learn in their training.

Based on the literature review, a pilot study with structured interviews was carried out with six TAs. The interviews were coded for positive and negative effects. These effects were then divided into different subcategories as described by the TA. The most common positive effects were an increase in knowledge, satisfaction with being a TA, and the new perspective gained by being a TA. The other positive effects fall in the categories of skill increase, social value and outside value. The most common negative effects were issues related to balancing responsibilities and conflict. Less common negative effects were students not respecting boundaries, bad preparation, redundancy and impatience as a result of working with students.

In a best-case scenario, the TAs have no issue with balancing their work and can solve all conflicts easily. In a worst-case scenario, TAs suffer mentally from the workload and don't increase their skills or knowledge. Offering additional training to TAs to help develop time-balancing skills could decrease the negative effect of balancing issues. Acknowledging the role of TAs on a national scale could offer the TAs more outside opportunities. Researching a way to increase the social value of being a TA could increase the positive effect that having a good community has on a TA and the satisfaction experienced by TAs.

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## Chapter 1 Introduction

Many universities in the Netherlands make use of Teaching Assistants (TAs) [1]. The University of Twente (UT) is no different and employs numerous TAs. A Teaching Assistant, in its most simple form, is a student employed by the university to help a lecturer with a course. Nearly always a TA has taken the course previously ensuring an understanding of the course material and the course layout. Apart from the role of helping a lecturer, the exact tasks of TAs can differ greatly from course to course. There are common forms TA mentoring takes, with the most common one that of Cross-year small-group tutoring [2]. In this form of teaching, a higher-year TA instructs students currently taking the course, commonly during tutorials.

Because of their roles, TAs have a unique role in education by being both a student and being part of the teaching context. A well-known model related to education is the Biggs 3P model [3] as seen in Figure 1. The model emphasises how all parts of education affect each other. The teaching context influences how a student completes tasks, for example, by how a task is explained to a student. A student affects how a teacher gives instructions based on how the teacher perceives them. So, a teacher influences a student's process and product, and so does the student for the teacher. Therefore, it can be expected that when TAs work in the teaching context this will affect their student process and product, and vice versa.

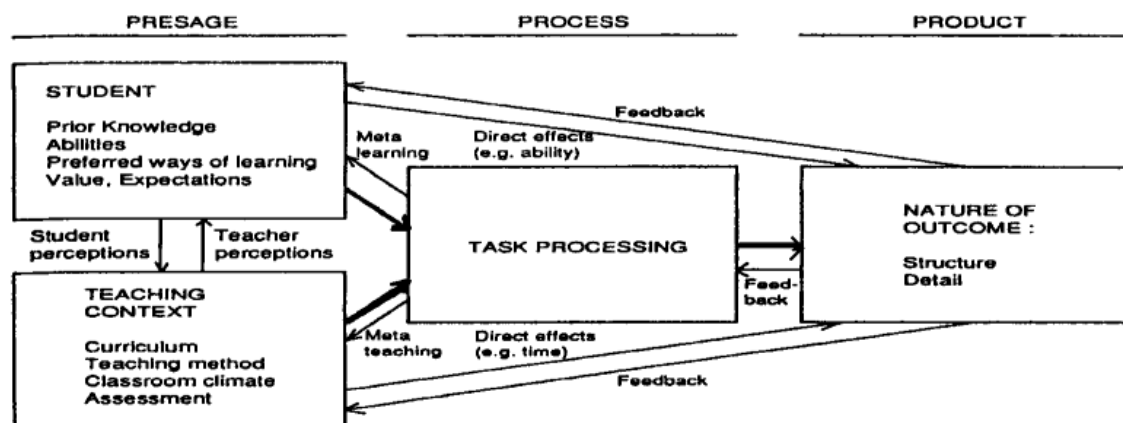


Figure 1 3P model.

A TA's part in the teaching context has been fairly researched [4], but their part as a student has been less focused upon [4]. The effects are not entirely unknown, for example, research has been done on the intended learning outcomes of TA programs [5]. These studies have formed an understanding of the skills and emotional value gained by being a TA. However in the literature, while time-management skills were discussed [6], there is not a large focus on the effect on a TA's education in regards to their own study. For example,

how TA tasks might take away study time, or if grades improve or decline from being a TA. By gaining these insights a clearer view of the effect on a students' education, when they become a TA, can be gained. Including the insight related to the skills and satisfaction gained by being a TA will create an even higher understanding.

When the effects on a TA's education are understood better, multiple scenarios for the effects could be imagined. When knowing what scenario is desired, advice could be formed to try and reach the desired scenario. Forming an understanding of the effects on a TA's education and utilising it to form advice is the goal of this paper. The goal has given form to the following research questions (RQ):

**R1:** How is a student's education perceived to be affected by being a TA?

**R2:** What are best- and worst-case scenarios for how a TA's education is affected?

**R3:** What can be done to help improve the positive effects on a TA's education?

To answer these questions the perception of a TA on their education will be collected through interviews. Fieldwork will be done to gain more insight. Researching the perspective of the TA is a relatively new focus in the literature and the timespan of the project is relatively short; for this reason, the research will take the form of a pilot study. Based on the 3P model [3] an effect on a student's education can be expected to be found. As being a TA takes time, an effect exclusively about time will likely be encountered as well. A common known effect of teaching course material is an increased understanding of the subject matter [7], this effect can also be expected to be found.

In a best-case scenario, a TA would not suffer negative effects from being a TA. They would learn many useful skills from being a TA and gain a large amount of satisfaction from it. In a worst-case scenario, they would suffer purely negative effects. The workload would be unbearable and lead to stress and mental harm. Finding solutions to negate the negative effects and to promote the positive effects on a TA's education is the groundwork for the advice.

In Chapter 2 a literature review is carried out regarding the available literature relating to TAs. The review focuses on the effects experienced by TAs and discusses the effects on teachers as well. Chapter 3 defines a case study research design as the one used in this research. The data collection process of fieldwork and holding interviews is described in Chapter 4. The results of this data collection are examined in Chapter 5. The answers to the interviews are analysed and the fieldwork is discussed. Based on the results the found effects are described and used to create scenarios and form advice in Chapter 6.

## Chapter 2 Literature Research

In this chapter, a literature review on the effects on TAs is written down. After a short discussion is written regarding the goal of education.

### Literature review

#### Introduction

In 2013 the UT started with the use of the Twents Onderwijs Model (TOM). One of the building blocks of this education method is its variety of teaching methods [8]. To facilitate this as well as many other tasks present at a university, the UT makes use of Teaching Assistants (TAs). Teaching Assistants can be both undergraduate and graduate students who help with education in whichever way a lecturer sees fit. Having a TA present can be a great boon to the students following a course as there are more people present to help. A growing body of literature is focused on this effect [4]. Nevertheless, students are not the only people present in a classroom and therefore not the only ones affected by the presence of TAs. The teachers who have to organize all the TAs and ensure that they add to education are affected by their presence [9]. The TAs themselves are also affected. The effects on TAs are less researched [4] compared to the effects on the students, even though it is important.

Having an understanding of these effects can serve as the building blocks for the graduation project related to this literature review. This project will investigate the effects of being a TA at the University of Twente. To research this, qualitative research will take place. Which areas will be researched will be partially based on the results of this review. The results achieved can ensure that TAs get the best chance to develop on a personal level, something the UT strives to do for all its students and employees [10]. To form the understanding, first, the effects on the TAs are examined, where the positive effects are examined before the negative ones. Then, the effects on the teachers are looked at in the same order as for the TAs. The teachers are not the focus of the study, but their situation could offer insights on the TA's situation. At last, conclusions are drawn on how TAs are affected.

#### Effects on TAs

There are many positive effects of being a TA found in the literature. To facilitate an easier discussion of them they are divided into three categories.

**The first category is the effects directly impacting a TA's education.** In this category, there are three effects. The most discussed effect is that of a better understanding of the subject matter [5], [6], [7], [11], [12]. Reynolds et al. mention the Latin proverb "*by learning you will teach, and by teaching you will understand*" meaning when a TA teaches a course to other students they will understand the course literature better themselves [7]. The



TAs interviewed by Murray support this proverb as their teaching abilities helped them to get a better grasp of the course [5]. The TAs in Rompolski et al. discuss that the understanding of the material was motivated by their role as authority [12]. The TAs interviewed by Fingerson et al. do not mention that the teaching helped them, however, one TA does mention that because the course was differently structured she grasped some subjects better [11]. Felege et al. also do not report that teaching is what helps, simply that an increase happens [6].

Interestingly only Sellnow discusses the second positive effect of a TA also learning the subject matter better because there is a mentor figure present to help [13].

The third effect influencing a TA's education is that they get an increased agency in their learning [5], [6], [7], [14]. As Reynolds et al. mention, TAs get higher control over their learning when they discuss learning and its many facets. Part of this higher agency is that the TAs create better study habits as they feel they need to "*lead by example*" [7] so they try to be "*more focused and participative student[s]*" [7]. Felege et al. and Murray also support that TAs feel that they should be an example for the students [6], [5]. Breland et al. in contrast assigned an increase in a TAs motivation and interest in their courses to the writing of weekly reflection reports [14].

#### **The second category of effects is the effects related to a TA's teaching skills.**

Naturally, when a TA enters a teaching role, they will develop skills related to that. There are four effects related to teaching. Here the most frequently encountered effect is that of a TA developing a better understanding of being a teacher [4], [5], [7], [11], [12], [15]. As Murray et al. write TAs "*understand the professor's job more*" and "*understand the process of the course better*" [5]. Flinko simply explains they got a glimpse of the job of a teacher [4]. Rompolski supports this and also mentions finding it exciting that the TAs had become more curious about finding out how to become professors themselves [12]. Reynolds reports that TAs found teaching to be more multifaceted than they were expecting [7]. Fingerson et al agree with the heightened understanding but add that also the negative sides were encountered by the TAs as students were less motivated than expected [11].

The second effect is that of better leadership skills something found by both Murray and Reynolds et al. [5], [7]. For example, in leading the conversation during group discussions.

The third effect related to this is that of an increase in self-confidence which can take the form of "*helping to overcome shyness*" as found by Murray [7] and feeling "*comfortable in front of the class*" [7] reported by Reynolds et al. However, Murray finds that confidence-building skills are less prevalent than other positive effects [5]. One effect he does find more strongly and

The fourth effect related to teaching is that of an increase in communication and public presentation skills [5]. This is supported by Reynolds et al. who also write about this increase [7].

**The third category of effects has less of a theme and is more a collection of general positive effects related to personal development.** There are five of general positive effects found.

The first positive effect is the satisfaction that the TAs experience from teaching and seeing their students understand the literature [6], [7], [12]. Reynold simply reports the overwhelming satisfaction TAs experience [7]. The TA of Rompolski felt incredibly proud for being able to help [12], similar to this the TAs of Felege et al. described how they felt satisfied if a student had a sudden understanding because of their help [6]. The TAs also increase skills not directly related to either being only a student or a teacher. The increase in these skills are the second third and fourth positive effects. These are an increase in writing skills [4], [5], critical thinking and balancing/time managing skills [4], [5], [6]. Flinko et al. for this increase refers to the State University of New York faculty senate "*guide for Teaching Assistantships*" and also discusses Flinko's own increase in skill [4]. Murray with writing skills means both writing papers as public communication skills for time managing skills they put planning lessons as a part of teaching skills [5]. Felege et al. identified that balancing skills were improved as TAs balanced their tasks with other responsibilities [6]. These are skills which can help a TA in general in life. The last positive effect is the only one which is not an increase in skill, and it is the improved relationship with faculty that a TA develops. As a TA works with their mentor/professor they develop a higher feeling of community as found by Reynolds et al. and Felege et al [6], [7]. Most positive effects related to becoming a TA are increases in skills. These skills are both related to being a student and to being a teacher and some are related to both or neither.

**Only five negative effects were found which are therefore not divided into sub-categories.** The first two negative effects are related they are the anxiety TAs feel for grading their peers and how they feel stressed because they are leading their friends as discussed by Felege et al. [7]. They use quotes by Julie Owen [16] to clarify how TAs can experience anxiety when they have to grade (near)-peers whom they might even have a close relationship with. Felege et al. continue to quote Owens to explain that this close relationship can also lead to the TA feeling like more of a peer and therefore not seen as important and seen as less valid than the teacher [7] [11] [16]. This is something Fingerson et al. also reported from the student perspective [11]. The fourth negative effect of being a TA is the workload of being a TA. In the positive effects it was discussed that TAs improve their time management skills, regardless of this being a TA still takes a large amount of time [9], [17]. McDonald et al. reported that a least, when a TA is in charge of communication, they

can become overworked [9]. Marbouti et al. discuss that the workload of students is already high and that TA training adds even more work [17]. Güler et al. add to this by explaining that a TA might also get a 'sticky task' which is a task that is repeatedly assigned to a singular TA as it is particularly bothersome and no one else wants to do it [18]. In short, there are many more positive than negative effects. However, the negative effects are more related to the emotional side of being a TA and to the time a TA has available to them.

### **Effects on teachers**

Just as with the TAs, the teachers experience positive and negative effects. There are seven positive effects for teachers. The first is the simple benefit of their being someone to help with tasks such as taking attendance and grading [11], [13]. Fingerson et al. found that with the help of TAs, the teachers had more time for other tasks [11], Sellnow simply mentions the help TAs offer [13]. The second, third and fourth effects, as found by Fingerson et al. are all effects directly related to the teacher themselves. The presence of a TA means there is a peer who can give feedback on the lessons immediately which means a teacher can learn from a TA and can learn to be more open to feedback. The presence of a TA also asks a teacher to mentor them which helps them to increase their mentoring skills [11]. The fifth, sixth and seventh effects are related to both the teacher and the students. As mentioned previously a TA is a close peer to the students, and while this has negative effects it can also be a positive thing. As Reynolds et al. mention, a TA can connect faculty and students as they are more like a peer to the students [7] and can help motivate students to do well and or be a TA themselves [7]. Fingerson et al. mention that students might find that TA more approachable [11]. These positive effects on the students will help them in the lessons which will make the teachers lessons more effective.

There is truly one negative effect of TAs on teachers which is the workload/time spent. Most of this negative effect on teachers were found in papers related to finding solutions to this negative effect. This contrasts with the effects on the TAs themselves which had more studies focused only on the effects, and possibly offering advice. The main negative effect of TAs on teachers is that managing them takes a large amount of time which a teacher might not have [9], [18], [19]. There are a lot of constraints to assigning tasks and Lim et al. describe it as the "*most difficult duty of a department chair*" [19]. It can be difficult to gauge a TA's individual skill set as seen by McDonald et al. [9]. Lim et al. found that if a TA does not know the material well enough it will take even more time for them to be able to teach and this will take time from the teacher[19]. Güler et al. also discuss the issue of ensuring that the TAs are satisfied with the result [18]. One specific time-consuming part of working with TAs which is mentioned are the weekly meetings needed to keep up to date with the TAs which both McDonald and Henderson had [9], [15]. Teachers experience both

positive and negative effects. The positive effects are more related to the skills of a teacher and the work a TA does. The negative effects are more related to the work as a result of having a TA.

In the literature, many effects were found to affect TAs. For the TAs the positive effects are mostly related to skill increases. These skills are related both to being a student and to being a teacher. The negative effects for TAs are mostly about the amount of time spent. When researching the unique role of TAs, these effects need to be considered. However, not all research bases their finding on the experience of the TAs themselves, so there must be a possibility of the TA discussing effects which are not found in the literature. Basing the research on the perspective of TAs naturally means that the view is biased, and the effects will be the ones a TA perceives and might not be the ones found in the literature. Because of this fact, the main research question focuses on the perceived effect of being a TA.

### The goal of education

The main research question asks how a TA's education is affected. To accurately answer this question, one must decide what education is, otherwise knowing if it is affected will be hard to know. The definition of education is: *"the process of teaching or learning, especially in a school or college, or the knowledge that you get from this."* [20]. According to this definition, being a TA would fall under education as would the skills acquired by being a TA. However, as Osberg and Biesta point out: *"In contemporary discourse, 'education' is generally understood to name a particular kind of functional event: one that demands structured teaching and learning of the 'right' things (and not the wrong things) to achieve pre-determined, normative ends."* [21]. They continue saying this is achieved with the use of a curriculum which are the specific educational events used to achieve the normative ends. With this understanding of education, only the grades of a TA and their understanding of a subject would qualify as their education. It could be argued that if the learning goal of a program is that a student has didactic skills then being a TA should be considered as a part of reaching the normative ends. Being a TA would, however, still not be part of the curriculum. In short with this definition, only grades, as a measurement of having reached a normative end, would be assumed as a part of education that can be affected.

Biesta himself offers another way to regard the goal of education [22]. He identifies three domains of educational purpose which can be found in Figure 2. As described in the figure, Qualification is the acquisitions of knowledge; Socialisation is about being part of society; and Subjectification is about going from an object to the subject of their own responsibility and initiative [22]. With this broader definition of the goals of education,

multiple areas of being a TA would fit into the domains. The skills gained by being TAs are part of a student's education and would fall into the category of Qualification. The change in attitude towards their learning process that was found in the literature [7] would fall into the category of Subjectification. The increased feel of community as a result of a better relation with their teachers [6], [7] would be part of Socialisation. Being a TA could help fulfil all three domains of educational purpose. Because of this not only grades will be discussed when a TA's education is mentioned.

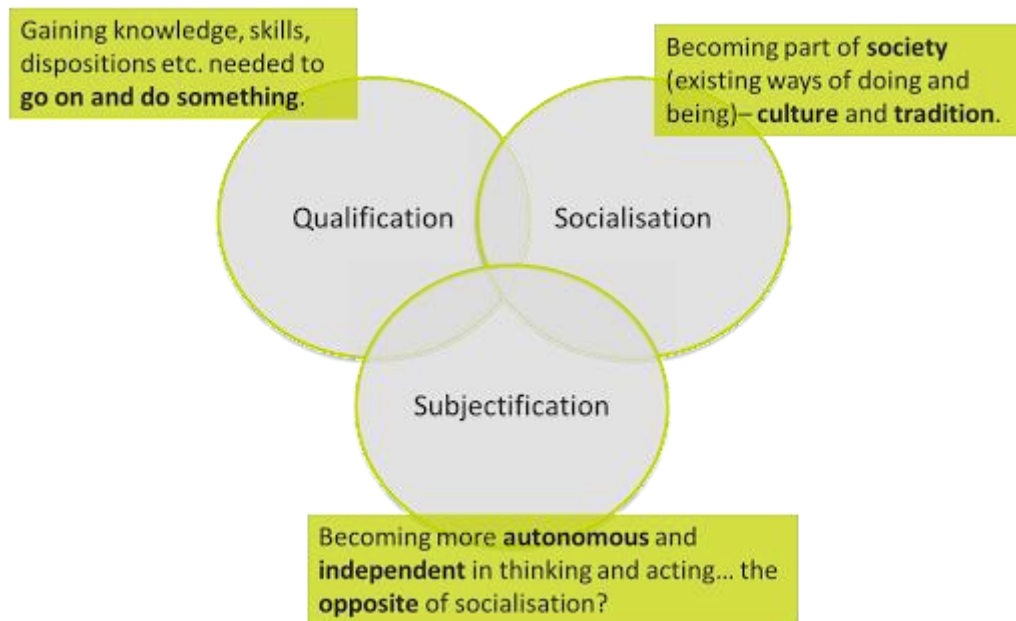


Figure 2 The three domains of educational purpose [23]

## Chapter 3 Methods

This chapter will discuss the Methodology used for this research. It will first give a general outline of the method used. After specific parts are elaborated on, it is described how this research completed the steps of the method. At last, techniques used to help with the methodology are explained. The method that this chapter is based on is the method described by Robert K. Yin in his book “Case Study Research and Application” [24].

### Case study research

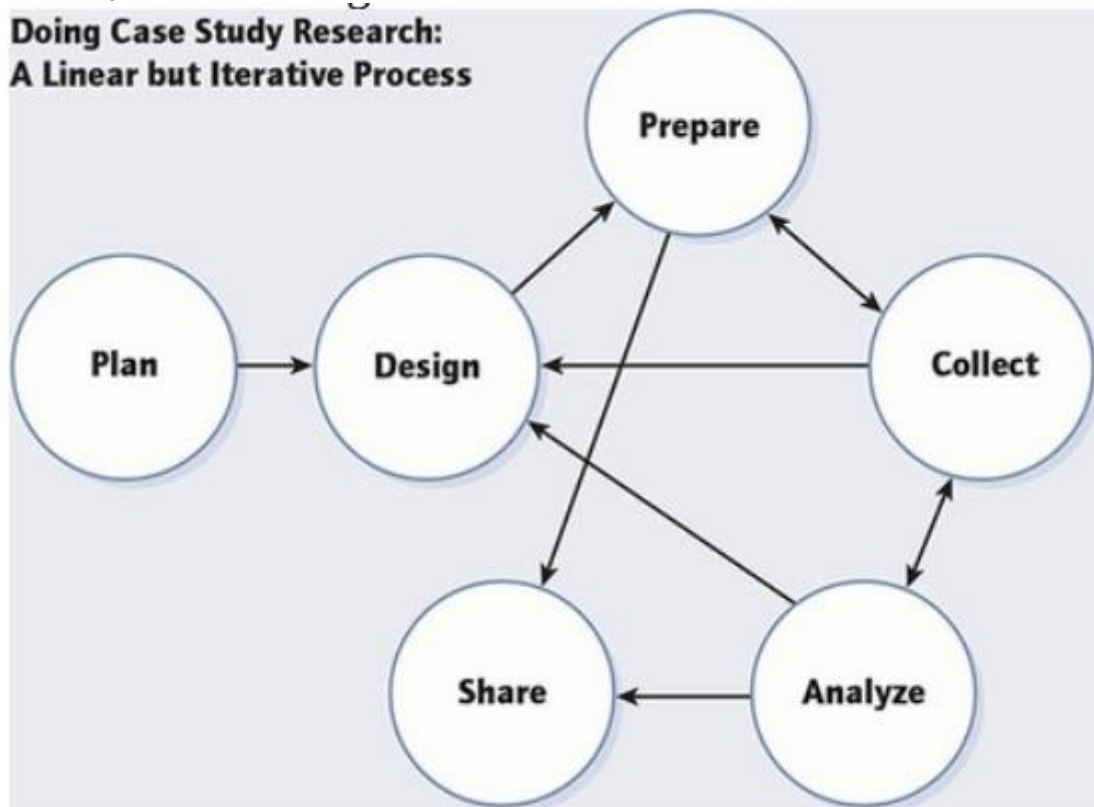


Figure 3 Case study method diagram [24].

In Figure 3, the central steps of the case study research method can be found. The first step is to plan. In this step, it is decided whether doing case study research is a good way to answer the research questions. The second step is to identify the case to research. The third step is focused on preparing the case study protocol. The fourth step is about the collection of the data which is analysed in the fifth step. In the final step, the results are processed in such a way to communicate them well to the target audience. A further explanation of each step is provided below.

## Plan

To decide to use case study research, the examined situation should meet 3 conditions. The first is that the research question should be in the form starting with 'how?' or 'why?'. The second condition is, that there should not be a need to control the behavioural events. The third condition is that it should focus on contemporary events. After ensuring the research meets all these conditions the next step can be taken.

## Design

In this step, the case to focus on is decided. Part of this is, deciding how many and what type of case will be researched. Four different designs are shown in Figure 4. It is possible to focus on a single-case or a multiple-case design. The case can be either holistic or embedded. The case must not be too broad as that would make the research near impossible to complete. The case chosen is based on the questions that need to be answered. A case can be many things such as a person, a firm or a situation. After identifying a case, boundaries must be identified. For a group case for example, it must be decided who is part of the group.

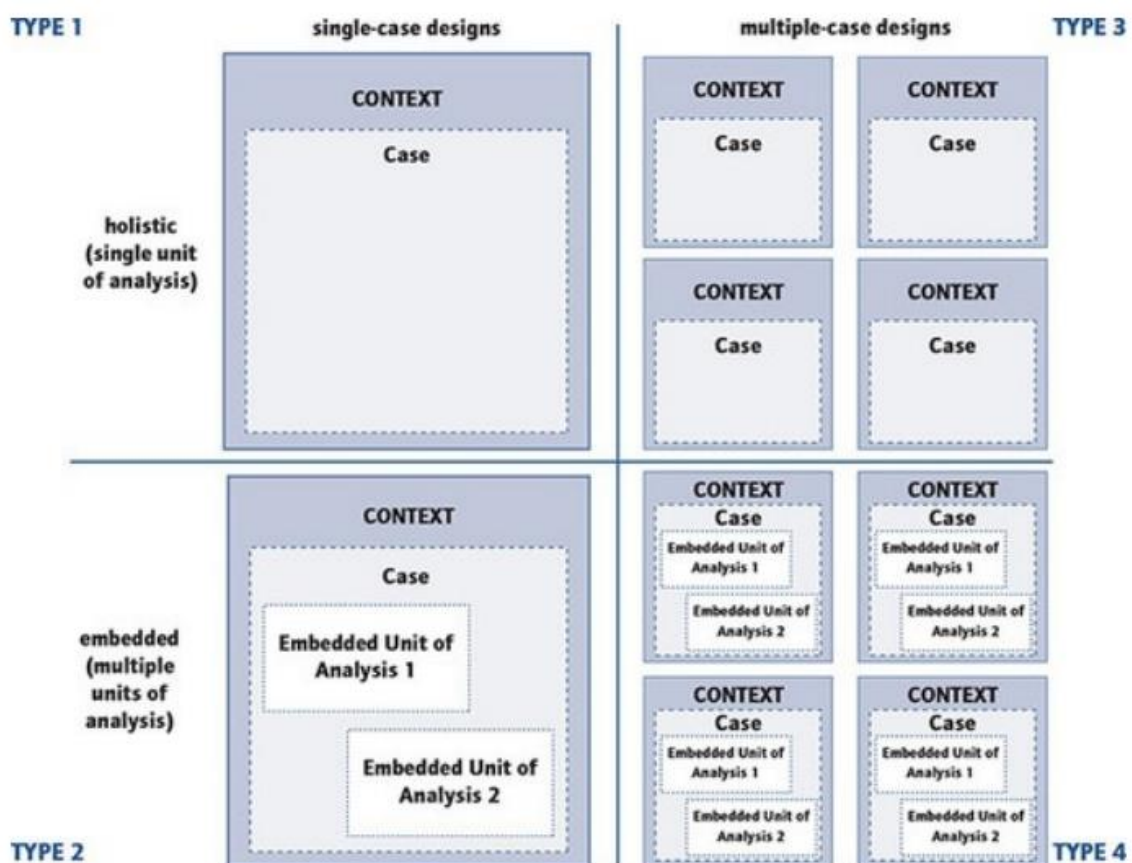


Figure 4 Different case study designs [24]

## Prepare

This step of the progress tasks the researcher with writing down the protocol for the research. The outline for such a protocol can be found in Appendix 2. As seen the protocol is divided into four groups with their focus. To prepare for the research the entire protocol is filled out. This is particularly important if multiple cases are observed.

<p><b>Section A. Overview of the Case Study</b></p> <ol style="list-style-type: none"><li>1. Mission and goals reflecting the interests of the case study's sponsor (if any) and audience</li><li>2. Case study questions, hypotheses, and propositions</li><li>3. Theoretical framework for the case study; key readings</li><li>4. Role of protocol in guiding the case study researcher (<i>notes that the protocol serves as the agenda for the researcher's line of inquiry</i>)</li></ol> <p><b>Section B. Data Collection Procedures</b></p> <ol style="list-style-type: none"><li>1. Names of contact persons for doing fieldwork</li><li>2. Data collection plan (<i>covers the type of evidence to be expected, including the roles of people to be interviewed, the events to be observed, and any documents to be reviewed in the field</i>)</li><li>3. Expected preparation prior to fieldwork (<i>identifies specific information to be reviewed and issues to be covered prior to fieldwork</i>)</li></ol> <p><b>Section C. Protocol Questions</b></p> <ol style="list-style-type: none"><li>1. The practice in operation and its innovativeness:<ol style="list-style-type: none"><li>a. Describe the practice in detail, including the deployment of personnel and technologies, if any.</li><li>b. What is the nature, if any, of collaborative efforts across communities or jurisdictions that have been needed to put the practice into place?</li><li>c. How did the idea for the practice start?</li><li>d. Was there a planning process, and how did it work? What were the original goals and target populations or areas for the practice?</li><li>e. In what ways is the practice innovative, compared with other practices of the same kind or in the same jurisdiction?</li><li>f. Describe whether the practice has been supported from the jurisdiction's regular budget or as a result of funding from an external source.</li></ol></li><li>2. Evaluation of the innovative practice:<ol style="list-style-type: none"><li>a. What is the design for evaluating the practice, and who is doing the evaluation?</li><li>b. What part of the evaluation has been implemented?</li><li>c. What are the outcome measures being used, and what outcomes have been identified to date?</li><li>d. What rival explanations have been identified and explored, for attributing the outcomes to the investment of the federal funds?</li></ol></li></ol> <p><b>Section D. Tentative Outline for the Case Study Report</b></p> <ol style="list-style-type: none"><li>1. Audience(s) for the report and stylistic preferences for communicating with the audience(s)</li><li>2. The law enforcement practice in operation</li><li>3. Innovativeness of the practice</li><li>4. Outcomes from the practice, to date</li><li>5. Law enforcement agency context and history pertaining to the practice</li><li>6. Exhibits to be developed: chronology of events covering the implementation and outcomes of the practice at this site, logic model<sup>6</sup> for the practice, arrays for presenting outcome and other data, references to relevant documents, and list of persons interviewed</li></ol>
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Figure 5 Case study protocol outline.

## Collect

In this step, data is collected from multiple sources. In case studies, six sources of evidence are commonly present. Documentation, archival records, interviews, direct observations, participant observation and physical artefacts. These should be chosen to be used is based on how well they are available to the researcher.

## Analyse

Four general strategies are used for analysis. Relying on theoretical propositions, working your data from the “ground up”, developing a case description and examining plausible rival explanations. The one used in this paper is relying on theoretical propositions. In this strategy, the one follows the theory to analyse the data. Apart from general strategy analytic



techniques are used to analyse the data. One such technique is that of Pattern Matching. This technique tasks the researcher with comparing an expected pattern with the data collected. The matching of the patterns can add to the internal validity of the case study.

## Chapter 4 Data Collection

This chapter discusses the progress of data collection. First the chosen case is explained, second the fieldwork is written about. Last the process of the interviews is communicated

The research design met the requirements for case study research and that design was chosen. For the specific case, it was decided to limit it to one group of TAs. Making it a single holistic design or type 1 as found in Figure 4. This was decided to have a clear group and not make the scope of the research too great. For the case, the TAs present in module 8 of technical computer science (TCS) at the UT were chosen. After a case was chosen the case study protocol was written, see Appendix 2. For data collection, it was decided to interview the TAs and observe developments regarding TAs and the training followed by them. Because of relatively novel focus on TA's perspective and the time available, it was chosen to make the study a pilot study.

To form a better understanding of the development done regarding TAs in the Netherlands and to get a good grasp on the state of the art the Project Student Kwalificatie Onderwijs (StuKO; student, qualification, education) symposium was visited. StuKO is a project focused on helping TAs in the Netherlands develop professionally. The project has three parts. The first part is to offer training to TAs to help them feel secure in their skills and to ensure the quality of teaching provided by TAs. The second part is to get the trainings acknowledged nationally and to offer certificates to TAs. The third part is to offer TAs the possibility to try if teaching is a profession fitted for them. As part of this project, they hold a symposium to discuss the state of the art and to exchange ideas. One of the recent developments in the field is the use of Edubadges. Edubadges are a national program to award students with certificates for courses. These Edubadges were given, for the first time, to TAs for the courses they took. Edubadges would allow TAs to gain acknowledgement for following TA trainings. This could have a positive effect on the TAs education as they have more credits.

The UT employs TAs based on the number of hours they take on. To become a TA, a student either asks the teacher or the teacher asks the student. During the first year of being a TA, a student is expected to follow a course especially designed for TAs. This course focuses on the didactic skills of the TA, which in the course are referred to as Learning Assistants. The course can be taken before or after the student starts their job as a TA. The

course takes around 4 hours spread out over 4 lessons. There are also homework assignments to help the TA with reflection. The first of the training sessions focuses on the goal a TA has for following the course and on the expected difficulties of being a TA. The learning goals of the course are laid out [25].

**Motivating** students by being aware of how learning works.

**Using** adequate listening skills.

**Asking** the relevant questions, aimed at making the learner responsible.

**Providing** constructive feedback.

**Helping** students solve problems in a systematic manner.

**Making** contact and being approachable.

**Explaining** the module or course as a whole, including learning objectives, learning activities and assessment.

**Making** his/her own learning experiences explicit.

**Reflecting** on his/her own role and performance as a Learning Assistant.

The TAs are tasked with choosing a learning goal to focus on and getting to know each other. In preparation for the second session, the TAs are asked to reflect on their own learning experience, to complete a task assigned to their students and to read a handbook about learning and problem solving. The handbook explains the revised Bloom's taxonomy [26] and the self-determination theory [27]. During the session, it was discussed what learning is. Additionally, the difference between a fixed and a growth mindset was explained. The third session focused on communication and providing feedback. In advance, the TAs are tasked with reflecting on what makes for active listening and effective feedback. In the session, multiple scenarios in which communication with students is needed were roleplayed in small groups. The roleplay was discussed with the whole group and advice relating to communication was shared. The final session focused on reflection. The TA is tasked with writing a reflection report in which they choose one of the learning goals of the training and explain why it is important and then provide an example of using the learning goal.

To prepare for the interview for data collection the questions were shared with the head TA of module 8. They were interviewed and provided feedback on the questions. The questions focus on the effects and a student's education, see Appendix 3. The TAs were first approached with the use of an interest form. The form asked a TA to leave an email on which they could be contacted regarding the interview. Only three reactions were acquired of this and only one led to an interview taking place. After this, contact information for more TAs was shared with the researchers. This way, three more TAs were contacted. A final TA was tasked to be part of the research as a replacement for missing a session prior. In total, an  $n$  of six was acquired. All interviews were conducted by a single researcher on a one-on-one basis with the TA. Before the interview, the TAs filled in a consent form. After a recording was

started. The questions were asked by the researcher. They were structured interviews. The interviews took around 10-15 minutes to complete.

The recordings of the interviews were transcribed. After transcription, they were coded. In the first round of coding only good and bad effects on education were coded. In a second round of coding the effects were labelled based on what the effect was. A description of each code can be found in Table 1 of Appendix 4.

## Chapter 5 Result Interpretation

This chapter analyses the results gained from the collection phase. In total, 138 good and bad codes were given. Five quotations were identified as both good and bad. There were 25 bad and 108 good codes. This gives a percentage of 21.0% bad effects and 79.0% good effects. Some effects were given multiple subcategories. The distribution of specific effects can be seen in Figure 6. To measure the reliability of the results the Kappa coefficient was calculated. A peer unrelated to the project was asked to code one interview, the results of which were used for the calculation. This resulted in a Kappa of 0,76 which can be classified as a substantial agreement [28].

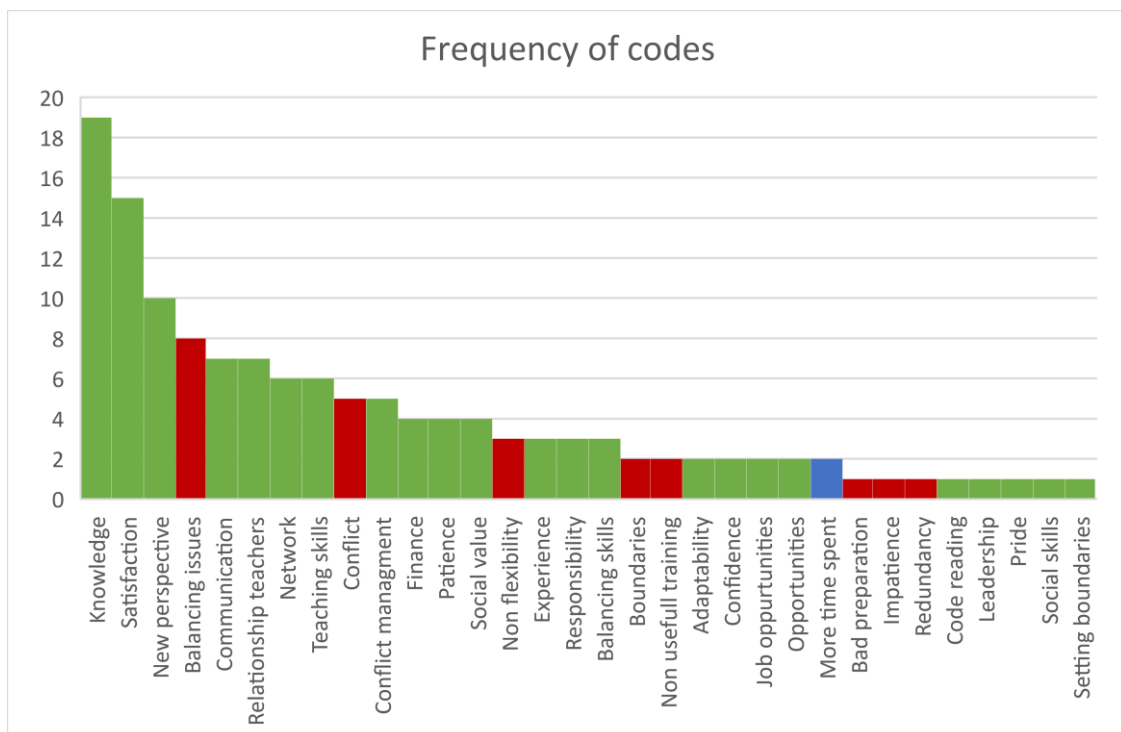


Figure 6 Frequency of codes.

The most reported effect is the increase in knowledge a student gains from being a TA. As mentioned previously, many people understand education to be the learning of the

'right' thing to reach a goal such as passing a test [21]. It follows that a TA would then mention an effect on passing tests when asked about their education. Two example quotes are the following:

*"If I'm the teacher's assistant for my own study, kind of going back and reading on the same subject, it helps me to recap the old studies."*

*"I learned the material that I was teaching a lot better because we have to teach something."*

As seen in the first quote many TAs mention that repeating the material helped with their increase in knowledge. They also mention that having to teach the material helped. This second reason matches with the found reason in the literature which is how teaching material will ensure a better understanding of the material [7]. The first and most common option does not. This difference in perception could be because the TAs are less familiar with the theory that teaching a subject can help them to understand the material. In the TA training there is a theory discussed regarding learning, but this is applied solely to the students not the TAs themselves.

The second most mentioned effect is the satisfaction that the TAs experience. An example is the following quote:

*"You solve the problem, and, in their eyes, you know you are like a superhero and that gives you this kind of very warm feeling that you matter, that what you're doing is important."*

This is an emotional effect that TAs mention often, even when emotions are not commonly regarded as part of education, shines a good light on a TA's experience. Part of the satisfaction is from helping students. TAs also mention finding the whole experience fun.

The third most common effect is the new perspective gained by being a TA. This is mostly related to how education works from the university perspective but also to the whole learning process, as seen in the next two quotes.

*"It really helped me to not stress about my own studies because I understand how lenient administration could be like if you really have a good reason, you put enough effort into it you will be fine"*

*"I had gained a lot of insight into how the administration works."*

The rest of the effects mentioned, fall in the category of skills increase (communication, teaching, conflict management skills), the social value (relationship teachers, social value) or the outside value (network, finance, job opportunities). These effects were also found in the literature though the focus on networks was not often found in the literature.

The learning goals lined out for the TA training are the most described skills to have increased after subject knowledge, as they would fall under the category of Communication and Teaching skills. This could point to the effect of the training, however, one TA pointed out they already possessed the skills taught in the training and therefore felt it to be redundant. From these results, it is difficult to assess the positive effect of the training. The training does focus on skills used by TAs as they report having an increase in the skills.

The most common negative effect is balancing, which here is the balancing of their TA work with student work.

*“It takes more time than you would want.”*

*“There was a bit of a negative effect because it was hard to balance it all.”*

These answers agree with the literature that found that time effects and the emotional effects are the common negative effects of being a TA. However, TAs also mention increasing their time management skills by being a TA.

*“I kind of learned how to manage both things [student work and TA tasks] and my study is going to be quite well.”*

The increase in balancing skills is less common than the mention of balancing issues. Similarly, while TAs mention encountering conflict, they also mention gaining skills in conflict management and it is the same for impatience and patience and boundaries and setting boundaries. The only negative effects that do not have a positive counterpart are the non-useful training, the bad preparation and the redundancy. The redundancy was reported by a TA who had been a TA for multiple years. Reducing these negative effects and ensuring the positive counterparts of the other negative effects are present can be used as the basis for answering the research questions.

The TAs report many effects that they experience while being a TA. Validating that these effects are solely from being a TA is troublesome. The 3P model, as discussed earlier, and seen in Figure 1, shows that all parts of the learning process affect each other. Therefore, it can be assumed that being a TA affects the student. The effect of the time spent on TA tasks is clearer than a difference in mindset. The model, however, shows that meta-learning and teaching are also part of the learning process validating that being a TA can lead to new perspectives on teaching and learning as well as other effects.

## Chapter 6 Conclusion and Discussion

TAs are affected in many ways by education. They have two different roles they fulfil at the same time. They offer much to their students and teachers, but they also learn much. Understanding the specifics of these effects is the goal of this research. This goal led to the Research Question.

**R1:** How is a student's education perceived to be affected by being a TA?

TAs experience many effects on their education. A large amount is positive with knowledge increase, satisfaction and a new perspective on learning and university prime among them. They also improve multiple of their skills related to education. In this, they are aided by the teaching assistant course given by the university. TAs also suffer negative effects. The prime effect being the time taken by their tasks and the stress produced from this. Conflict also has a negative effect. These negative effects are partly negated over time when the TA, by gaining experience, learns how to deal with the effects. Gaining experience also offers a new negative effect on the redundancy of the TA tasks. Overall, a larger positive effect is observed when a student becomes a TA.

**R2:** What are best- and worst-case scenarios for how a TA's education is affected?

In a best-case scenario, there will be no negative effects. This is an unlikely case; however, the negative effects can be decreased. The more common negative effects already have a positive counterpart to negate the effect of the negative one. These effects must be boosted to balance the negative ones. The negative effects without a counterpart need a different strategy. The non-flexibility is a result of the new contracts utilised by the university which were required because of legal reasons and turning back this change is not possible. The non-useful training can be decreased by changing the information covered by the training or by not making the training mandatory. The redundancy could be a result of a TA job not offering a large amount of variability after a few years. The system of different TA levels could offer a solution in this regard. Other than negating the negative effects a best-case scenario should also promote the positive effects. One possible option could be to promote the social value of being a TA by promoting cohesion between TAs. Another positive effect could be to offer TAs more opportunities related to their futures. This could be more acknowledgement or by offering more ways for their skills to increase.

A worst-case scenario would decrease the positive effects and increase the negative ones. Most of the negative effects are related to the time spent on TA tasks and the emotional toll the work can take. TA tasks take up such a considerable amount of time that a TA would not have time remaining for their own study work. Alternatively, a TA could be able to complete their work but suffer mentally from the high workload. The TA could then also

hand in non-sufficient work which could lead to conflict between the TA and their teachers, team members, or students adding to the mental stress of the TA. A different scenario based on the reported negative effects is that a TA could have sufficient time for their tasks but that they are seen as dull and redundant which could still lead to a negative effect on the TAs mental state.

**R3:** What can be done to help improve the positive effects on a TA's education?

Based on the best-case scenario described above possible ways to help TAs can be formed. Aiding a TA with their time management and conflict management skills could help a TA gain these skills. This could be incorporated into the current TA training, however, as this would lay outside of the scope of the current training, a different, separate training could be developed. Making this training mandatory would go against the feedback of the current training already not being found useful by TAs. Another way to improve the situation for TAs is something currently being developed in part by StuKO and that is the use of qualifications given when a student finishes the TA training. This could make the training seem less redundant to students and could increase the opportunity given by being a TA. A final option would be to try and improve the social value of being a TA. Naturally, this should not be the focus of being a TA but being part of a community can lead to an improved experience for the student [29].

Many of the possible improvements mentioned need more research before they can be implemented effectively. To offer a TA training focused on the organizational skills that TAs need to develop, more research needs to be done, especially on what exactly this training should include. This could be a future research avenue. Exploring the training given at other universities in the Netherlands and abroad and comparing them could offer insight into this. Understanding the current social community present between TAs could help with improving it. Measuring a TAs skill increase during their time as a TA in a quantitative manner, either by grade analysis or with different tests could give interesting results to contrast with the findings of this research. It could offer a better understanding of the situation of TA.

As this study was a pilot, conducting the study with more participants could help with gaining additional insight into the case. The study could also include different embedded units from different studies. If another study is done, it could be decided to change some of the questions, as currently, some questions focus on a specific skill gained by TAs ensuring this skill has a high frequency among the codes. The questions could remain the same but then it should be considered while analysing the answers from a statistical viewpoint.

## Appendix 1 Bibliography

- [1] StuKO, "Deelnemende instellingen," StuKo project. Accessed: May 24, 2024. [Online]. Available: <https://stuko-project.nl/deelnemende-instellingen/>
- [2] K. J. Topping, "The effectiveness of peer tutoring in further and higher education: A typology and review of the literature," *High. Educ.*, vol. 32, no. 3, pp. 321–345, Oct. 1996, doi: 10.1007/BF00138870.
- [3] J. Biggs, "What do inventories of students' learning processes really measure? A theoretical review and clarification," *Br. J. Educ. Psychol.*, vol. 63, no. 1, pp. 3–19, Feb. 1993, doi: 10.1111/j.2044-8279.1993.tb01038.x.
- [4] S. M. Flinko and R. Arnett, "The Undergraduate Teaching Assistant: Scholarship in the Classroom," *J. Assoc. Commun. Adm.*, vol. 33, no. #1, pp. 35–46, Winter-Spring 2014.
- [5] J. W. Murray, B. Boaz, L. Cohen-Gee, J. Galligan, and C. Horlick, "Assessing Learning Outcomes for Undergraduate Teaching Assistants and Peer Mentors," *J. Scholarsh. Teach. Learn.*, vol. 22, no. 2, Jun. 2022, doi: 10.14434/josotl.v22i2.31276.
- [6] C. J. Felege, C. J. Hunter, and S. N. Ellis-Felege, "Personal Impacts of the Undergraduate Teaching Assistant Experience," *J. Scholarsh. Teach. Learn.*, vol. 22, no. 2, Jun. 2022, doi: 10.14434/josotl.v22i2.31306.
- [7] M. Reynolds, D. Sellnow, K. Head, and K. E. Anthony, "Exploring the Educational Value of the Undergraduate Teaching Apprentice (UTA) Experience," *J. Assoc. Commun. Adm.*, vol. 33, no. #1, pp. 17–34, Winter-Spring 2014.
- [8] University Twente, "What is TOM?," University of Twente. Accessed: Mar. 22, 2023. [Online]. Available: <https://www.utwente.nl/en/tom/whatistom/>
- [9] E. McDonald, G. Arevalo, S. Ahmed, I. Akhmetov, and C. Demmans Epp, "Managing TAs at Scale: Investigating the Experiences of Teaching Assistants in Introductory Computer Science," in *Proceedings of the Tenth ACM Conference on Learning @ Scale*, Copenhagen Denmark: ACM, Jul. 2023, pp. 120–131. doi: 10.1145/3573051.3593384.
- [10] "CODE OF ETHICS /GEDRAGSCODE University of Twente." University of Twente, 11 2019. [Online]. Available: <https://www.utwente.nl/en/service-portal/services/hr/resources/downloads-codes-of-conduct/en/code-of-ethics-english.pdf>
- [11] L. Fingerson and A. B. Culley, "Collaborators in Teaching and Learning: Undergraduate Teaching Assistants in the Classroom," *Teach. Sociol.*, vol. 29, no. 3, p. 299, Jul. 2001, doi: 10.2307/1319189.
- [12] K. Rompolski and M. Dallaire, "The Benefits of Near-Peer Teaching Assistants in the Anatomy and Physiology Lab: An Instructor and a Student's Perspective on a Novel Experience," *HAPS Educ.*, vol. 24, no. 1, pp. 600–612, Apr. 2020, doi: 10.21692/haps.2020.003.
- [13] D. Sellnow, "Informing the Undergraduate Teaching Assistant (UTA) Debate," *J. Assoc. Commun. Adm.*, vol. 33, no. #1, p. 15+16, Winter-Spring 2014.
- [14] H. Breland, C. M. Clark, S. Shaked, and M. Paquette-Smith, "The Benefits of Participating in a Learning Assistant Program on the Metacognitive Awareness and Motivation of Learning Assistants," *CBE—Life Sci. Educ.*, vol. 22, no. 3, p. ar30, Sep. 2023, doi: 10.1187/cbe.22-08-0156.
- [15] B. Henderson, "Mentorship of Graduate Teaching Assistants: Effects on instruction and a space for preparing to teach adults," *Stud. Teach. Educ.*, vol. 6, no. 3, pp. 245–256, Nov. 2010, doi: 10.1080/17425964.2010.518665.
- [16] J. E. Owen, "Peer educators in classroom settings: Effective academic partners," *New Dir. Stud. Serv.*, vol. 2011, no. 133, pp. 55–64, Mar. 2011, doi: 10.1002/ss.384.
- [17] F. Marbouti, K. J. Rodgers, H. Jung, A. Moon, and H. A. Diefes-Dux, "Factors that help and hinder teaching assistants' ability to execute their responsibilities," presented at the ASEE Annual Conference and Exposition, Conference Proceedings, 2013. [Online]. Available: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84884298214&partnerID=40&md5=97a74d9e60e8ed560bb6da3da38e371e>



- [18] M. G. Güler, M. E. Keskin, A. Döyen, and H. Akyer, "On teaching assistant-task assignment problem: A case study," *Comput. Ind. Eng.*, vol. 79, pp. 18–26, Jan. 2015, doi: 10.1016/j.cie.2014.10.004.
- [19] R. Lim, V. P. Guddeti, and B. Y. Choueiry, "An Interactive System for Hiring and Managing Graduate Teaching Assistants," in *Proceedings of the 16th European Conference on Artificial Intelligence*, Valencia, Spain, August 22-27.
- [20] Cambridge Dictionary, "Education," Cambridge Dictionary. [Online]. Available: <https://dictionary.cambridge.org/dictionary/english/education>
- [21] D. Osberg and G. Biesta, "Beyond curriculum: Groundwork for a non-instrumental theory of education," *Educ. Philos. Theory*, vol. 53, no. 1, pp. 57–70, Jan. 2021, doi: 10.1080/00131857.2020.1750362.
- [22] G. Biesta, "What is Education For? On Good Education, Teacher Judgement, and Educational Professionalism," *Eur. J. Educ.*, vol. 50, no. 1, pp. 75–87, Mar. 2015, doi: 10.1111/ejed.12109.
- [23] G. Biesta, *Good education in an age of measurement: ethics, politics, democracy*. Place of publication not identified: Routledge, 2015.
- [24] R. K. Yin, *Case study research and applications: design and methods*, Sixth edition. Los Angeles: SAGE, 2018.
- [25] T. Kuijk, "Learning Assistants SA training," Enschede, Apr. 25, 2024.
- [26] L. W. Anderson and B. S. Bloom, *A taxonomy for learning, teaching, and assessing: a revision of Bloom's*, Pearson new international edition. in *Always learning / Pearson*. Harlow: Pearson Education, 2014.
- [27] R. M. Ryan and E. L. Deci, "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being.," *Am. Psychol.*, vol. 55, no. 1, pp. 68–78, 2000, doi: 10.1037/0003-066X.55.1.68.
- [28] J. R. Landis and G. G. Koch, "The Measurement of Observer Agreement for Categorical Data," *Biometrics*, vol. 33, no. 1, p. 159, Mar. 1977, doi: 10.2307/2529310.
- [29] D. Smith, "Working with politics 'students as partners' to engender student community: Opportunities and challenges," *Politics*, p. 026339572311733, May 2023, doi: 10.1177/02633957231173372.

## Appendix 2 Case study protocol

### Section A

1. The goal of the study is to discover the effects on students when they become TAs. Based on the results advice can be created related to TAs.
2.
  - a. R1: How is a student's education (perceived to be) affected by being a TA?
  - b. R2: What are best- and worst-case scenarios for how a TA's education is affected?
  - c. R3: What can be done to help improve the positive effects on a TA's education?
3. This information can be found in chapter 2.
4. The role of the protocol is to gain an overview of the study and to ensure there is a plan to follow.

### Section B

1. The fieldwork contact person is the supervisor of the project.
2. The following data types will be collected in the following ways.
  - a. Interviews will be held with TAs to discuss the amount of time spent on being a TA and how they perceive to be affected by being a TA.
  - b. Direct observation of TAs training will be done.
3. Ethical approval needs to be acquired. Interview questions should be prepared.

### Section C

1. The practise
  - a. The practice is the use of TAs for computer science courses. There are around 45 TAs for 360 students. 60% of these TAs are senior TAs meaning they have already been a TA before. The other 40% are new TAs. There is one main TA which is the direct communication point between the teacher and the TAs. This is all for one course with one teacher.
  - b. The collaborative part of this practice is the TA training which is given faculty wide. There are also university-wide rules over TA contracts.
  - c. The idea came to be probably because there were a lot of tasks and teachers needed help and TAs already knew everything needed about the course.
  - d. The goal of TAs was to facilitate teaching at the university.
  - e. The use of undergraduate students is more common here than abroad. The practice of senior and new TAs is not present in all UT courses.
  - f. It is supported by the university which offers contracts to the TAs.

2. Evaluation of the innovative practise

- a. The evaluation will be done with explanation building.
- b. The evaluation has been implemented.
- c. The results of the interviews will be coded, and direct observations will be made during the training.

Section D

Section D has been deemed unimportant presently as the CreaTe project requires a specific outlay that will be followed.

## Appendix 3 Interview outline

Hi, thank you for participating in this interview. The interview is related to my graduation project. I'm researching the effects of being a TA on a student. For this, I have some questions related to your experience as a TA and how you believe it affected you.

How much experience do you have as a TA?

Why did you become a TA? What was your main motivation?

What are your expectations for being a TA?

Did you do the TA training already? If so, what did you learn there?

How do you respond if you don't know the answer to a question?

Did you gain skills in Conflict management?

How are you finding it to be a TA so far?

What have you learned from being a TA?

How is your own educational progress going on?

Was there a positive or negative impact on your education while being a TA?

Is your understanding of the subject increased or decreased after being a TA for the subject?

How much time do you spend on TA tasks/ how many hours do you spend on being a TA?

Are the tasks manageable?

Have you gotten any study delay by being a TA?

After becoming a TA have you found a new perspective on the administration of the university?

How is your relationship with your teacher?

On a scale of 1 to 10, how satisfied are you with being a TA?

## Appendix 4 Code Description

Table 1 Code descriptions

Codes	Description of Code
Good	A positive effect on the student's education is found.
Bad	A negative effect on a student's education is found.
Good/Bad	An effect is found that is both negative and positive. Or the student perceived the effect to be neutral.
Adaptability	Being able to adapt to different situations and work with people with different backgrounds.
Bad preparation	A perceived bad preparation was given before beginning TA tasks.
Balancing issues	When a TA is unable to balance schoolwork with TA tasks or suffers stress from balancing both.
Balancing skills	The skills gained by having to balance TA tasks with schoolwork and the positive effect of the gained skill.
Boundaries	A situation in which a student did not respect the boundaries of a TA.
Code reading	The increase in the ability to read code written by others.
Communication	The ability to communicate with others, both teachers and students.
Confidence	An increase in confidence was experienced by the student.
Conflict	Conflict present either between TAs or in the teams a TA mentored. This includes the negative effect of being a part of the conflict.

Conflict management	The skill gained by learning how to solve conflict.
Experience	The new experience of being a TA and what it offers.
Finance	The monetary gain of being a TA.
Impatience	The impatience displayed by TAs in situations found while being a TA.
Job opportunities	How being a TA helps with having more access to job opportunities.
Knowledge	An increase in knowledge, mostly in subject knowledge
Leadership	The skill of how to be a leader.
More time spent	When a TA spends more time than the hours prescribed on TA tasks.
Network	The network gained by being a TA. This includes the faculty members TAs work with.
New perspective	A new perspective gained on learning or the administration side of a university.
Non-flexibility	The experience of a TA with the new non-flexible contracts.
Non-useful training	When a TA perceives the training to not be useful to their learning journey.
Opportunities	Opportunities offered by being a TA not related to future employment.
Patience	The increased ability to display patience gained by being a TA.
Pride	A pride experienced by a TA for the work they do.
Redundancy	The redundancy in TA jobs and how there is little variability.
Relationship teachers	A positive effect on the relationship between a TA and the teachers they work with after becoming a TA.
Responsibility	The positive effect of being given responsibility for the task of being a TA.

Satisfaction	Fun and satisfaction experienced by TAs.
Setting boundaries	An increased ability to communicate boundaries and keep them.
Social skills	An increase in social skills when becoming a TA.
Social value	The community between TAs and it's positive effect on a TAs wellbeing.
Teaching skills	An increase in teaching skills gained by teaching students as a TA.