



INTERNSHIP REPORT

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At

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INTRODUCTION

In this internship report I will be describing and reflecting on my four month long, part-time internship. This constituted my Minor in the Year 3 of the Liberal Arts and Sciences program at the University College Groningen and assumed 15 ECTS of my third year academic credits. The internship was research based and was executed within the institution of University College Groningen as part of the external project of “*Gender inclusive education in the mathematics classroom*”. This project is being carried out by the two UG professors Oksana Kavatsuyk (UCG) and Jolien Mouw, which received a Teaching Fellow grant from the *Comenius* programme.

My main duty during this programme was to carry out research for the project coordinators about several topics associated with Education of Science, Gender Studies, and Identity. This research was composed of both reviewing and investigating existing scientific, psychological and philosophical literature content and in conducting pure qualitative research in the form of semi-constructed interviews. The expected goal for the project was for the internees to arrange a library and glossary supported by the research done on the previously mentioned topics that could be used by future Calculus 1 instructors at UCG (and perhaps outside UCG too) in order to improve the levels of inclusivity, stimulation and motivation of the students.

Before initiating the internship programme I formulated a Learning Plan, in which I indicated what my expectations, my professional and my personal learning goals were. In this report I will explain to what extent these parts of my Learning Plan were achieved, and what challenges I have encountered when I was doing so.

I have structured this internship report in the following way. Firstly I will talk about the process that took place preceding the beginning of my internship; what motivated me to choose this particular programme and an overview of the preparation for it. Secondly I will introduce a rundown about the project itself and briefly describe some background information on it. Then I will describe what my work in this project entailed: the tasks and activities I undertook. The last part of this report will include my personal reflection of the whole process of this internship: my functioning, learning outcomes and challenges I have encountered. Lastly, I will give a conclusion about what this internship has meant to me and a general outlook on what experience it has provided me with.

DESCRIPTION OF THE INTERNSHIP

PROCEEDINGS PREVIOUS TO THE START OF THE INTERNSHIP

MOTIVATIONS

Through my Liberal Arts and Sciences degree I have taken the major of Science and specialization of Physics of Energy, which has meant that most of my courses have been in the Science domain. Although my original plan was to envision my path at UCG in a way that would lead me to do a pure Physics masters in some specific field of Physics, this aspiration started to change a while back. During last summer I had found myself having conversations with my Maths and Physics teachers from high school about Science Education. I had the opportunity to hear them talk about how important the communication of science is for the growth of the field, since the way you communicate it will greatly affect the way the general public conceives the domain, the way scientists themselves interact with each other at work and, of course, how inclusive or not the field's community is. Since then, these issues have interested me greatly. I have always thought that the scientific world, as objective and unbiased as it is sometimes considered to be, needs a lot of work to be done on, especially in terms of who has been regarded as worthy of being involved in it. c

When I first saw the announcement for the vacancy of this internship, I was immediately very eager. At that moment, my exchange semester abroad at Dublin which I had been preparing for had just been cancelled due to Covid-19 and I was wondering what to do during the first semester of Year 3 instead. When looking at the vacancy I realized that Oksana Kavatsyuk was involved in it I was delighted, since she is one of the UCG professors that I have interacted the most with. I was also excited to hear that Maria Ioannou was also involved, because although I have not taken her classes (since I have taken mostly Science courses at UCG and not courses of her expertise), I had heard positive things about her from peers and found her subject very interesting. I immediately looked at the internship position more thoroughly and felt progressively more drawn to it. Being a female Science major myself, the gap between the representation of genders has not been unnoticed by me, so the idea behind this project instantly made sense to me and I could understand its relevance. I believe that recognizing the urgency of these topics was my main motivation for applying for the internship.

Since high school I have been becoming more and more exposed to the issue of underrepresentation of women and minorities in the fields of STEM. Already at a young age the difference between the presence of women and men in Physics and Mathematics classrooms was obvious and made me wonder where the origins of this exclusion lies. The times in which it was an accepted statement that “men are simply biologically better fit for mathematical and scientific

thinking” have long gone, and currently, the complex question about what makes the disciplines of Math, Physics, Engineering and Technology more inclusive for men than for women is finally being closely examined. Having been asking myself this very question for years now, I saw the internship vacancy as a great opportunity to get a little close to understanding this intricate issue.

APPLICATION AND PREPARATION

The application to the Internship was a smooth process. The indications on how to apply were clearly explained on the university’s web page *Nestor*. The *Orientation* section was very practical and, although it didn’t turn out useful for me (because I didn’t have to search for my internship), I still found myself using the tips and advice offered there. In order to apply to the internship provided by UCG, I completed my Internship Application in which I wrote about my motivations and briefly mentioned some personal learning goals.

In terms of preparation, once I found out that I had been accepted in the internship I immediately submitted my Learning Plan, which was a more extended version of the Internship Application in which I elaborated on objectives and aims for the internship. For this form, I was expected to talk about my professional and personal learning goals in a structured manner and following the guidelines of the SMART principle (Specific, Generic, Attainable, Relevant and Time-Based). These learning goals will be present in Appendix 1 of this document. I will bring these goals up again later on, where I will talk about how I think I have (or haven’t) achieved them and what the consequence of this has been.

My application was accepted in June of 2020, which meant I had a couple of months of summer before my internship was to start. During this time I did some light investigation on the topics of gender studies applied to scientific education and on women in STEM in general, in order to feel ready and have some preparatory material before my internship started. Throughout this very general investigation I came across *Girlboss.nz*, a New Zealander foundation that originated with the aim of closing the gender gap in STEM (*Girlboss.nz*, 2015) and is now a network of more than 10,000 high schools in Australia and New Zealand. I looked into the founders of this organization and got to know that Alexia Hilbertidou, the initial founder, created the programme at only 16 years of age and is now the youngest Commonwealth citizen to receive the honour of “*Queen’s Young Leader*” (at only 22 years of age (*Alexia*, 2020)). During this exploration I also got to know the different initiatives and projects *Girlboss.nz* has launched. This finding helped me become familiar with some of the existing programmes that are associated with this issue and gave me an idea of what the current situation is. I emailed Maria Ioannou about these findings and “book marked” them in preparation for the beginning of the internship.

EXPECTATIONS

After applying to the internship vacancy, getting accepted and carrying out some preliminary general research to get a brief overview of the matter of subject, I had a few expectations for the internship. Having had class with Oksana Kavatsyuk before and therefore having an idea of how it might be to work with her, I expected the internship tasks to progress smoothly and for her to be quite supportive during the process. Also, although I have never had class with Maria previously, I also had good expectations of working with her.

In terms of the work itself, I expected to be doing literary research for around half of the internship and to be doing qualitative research during the other half. I had no clear expectations on what exactly this qualitative research would look like, although I think I assumed that there would be some semi-structured interviewing and perhaps surveys involved.

TASKS AND ACTIVITIES

Our first meeting with the internship supervisors (Oksana and Maria) was introductory and helped us internees have a clearer insight of what we were going to be doing. The first step would be to design and to carry out a Survey. This survey was directed to second, third, and fourth year students at UCG that have taken part in the Calculus 1 course and the aim was to have an understanding of what kind of connection students have to Mathematics, their confidence in Mathematics, their overall thoughts and expectations for the course and its instructors. We worked on this survey during the first week of the internship, also having regular meetings with the other internees to update each other on our work. Once this survey was completed, we started sending it to all the relevant students and soon after we started receiving the first answers. We collected 13 responses in total which, although not enough to make up an adequate sample, was still insightful and a good starting point for the internship. We analyzed these responses and decided to make a small presentation on them in order to make it easier to show our supervisors.

Once the survey was completed and we had some a few conclusions drawn from it we decided that another survey might with improved questions would be useful and started working with that. We also began with the literary research, in which we were aiming to firstly obtain a general comprehension on the concepts of Mathematics and Science Identity, Gender Inclusion and Science Education and secondly, to start knowledge on the practices and initiatives that are already taking place. I decided to take brief annotations after every reading, because I believe having a short summary of every article I read would come in handy when thinking of questions to ask in interviews.

One of the first articles I read was “*The Science Identity and Entering a Science Occupation*” (Stets,

Brenner, Burke & Serpe, 2017), in which I encountered the terms of science identity and mathematics identity for the first time (terms that would be appearing very often from that moment). In addition to this, during those two first weeks of the internship I also discovered various podcasts and radio conversations on the topic that I found very interesting. I found that one named *“Inequality in Science”* by the Science Focus Podcast was particularly insightful and I enjoyed learning through a media type that is less conventional.

During the fourth week of the internship a few more meetings were held. We first had a meeting with the coordinators in which we decided we would consider the skills we would need throughout the entirety of the internship and agreed that reading on how to conduct a good interview would certainly be useful. Later that week there was a second meeting with only my peers in which we brainstormed about how we were going to improve the Survey and about the structuring of interviews we had planned on conducting with past Calculus 1 students about Mathematics Identity and their experience taking the course. During this week, alongside the work done with my peers and supervisors I also kept doing my own personal research. One of the papers I found particularly relevant in the course of Week 4 of internship was *“Looking beyond academic performance: The influence of Instructor Gender on Student Motivation in STEM fields”* (Solanki & Xu, 2018), a study in which motivation-related measures were taken into account when looking at the Role Model Effect in high education science classrooms. In this paper I learnt about the Pygmalion Effect for the first time, an interesting phenomenon in which high expectations lead to improved performance (Solanki & Xu, 2018). Just before the end of this week, another UCG student contacted me about a possible collaboration of projects. We organized a meeting online and he informed us that for a Rhetoric course his class had to design an “awareness plan” for a project or incintevie that could benefit from this promotion. He asked if they could do it on the Comenius project but this collaboration never pushed through since their deadlines didn’t fit with our timeline.

A physical meeting was held with Maria Ioannou in the fifth week of the internship. She made a few suggestions in respect to the progress of the interview we had been designing and proposed we make a document of “existing practices”, in which we could list interventions and programmes that are taking place already. This would of course help us when designing our own recommendations to apply in the Calculus 1 class at UCG. During that meeting we also decided that interviewing Oksana Kavatsyuk would prove useful, so we decided to structure an interview with her too. The rest of the week, alongside the complement of said library of Existing Practices I also searched for videos in which STEM professors were interviewed, in order to prepare for the interview with Oksana. Some of the content I found useful for this was the iGem Foundation videos on *“Women in Stem”* in which professors in different scientific fields around the world get interviewed by participants of the foundation (“Teams/Ambassadors/Women In STEM - 2020.igem.org”, 2021).

During the seventh week we arranged and underwent a meeting with Lucy Avraamidou, professor of Science Communication at UCG and expert in Science Education, in which we told her

about our progress so far and about our future plans. She gave us some advice on how to approach different topics and introduced us to the subject of Queer Theory applied to the education of Science. I found this meeting extremely insightful, since I became exposed to an approach I hadn't even considered before and it reshaped the way I was looking at the problem of exclusion in STEM. I spent the week following this meeting reading articles and papers that Lucy had sent us on the topic of Gender Identity and by the end of Week 8 I felt I had become familiar with an area I hadn't really interacted with before. Some of these readings were "*Gender Issues in Education for Science and Technology: Current Situation and Prospects for Change*" by Acker and Oatley; "*Judith Butler's Notion of Gender Performativity*" a Bachelor thesis from the University of Utrecht; and "*A queer Turn in Mathematics Education Research: Centering the Experience of Marginalized Queer Students*".

The biggest part of the literary research was almost completed by the end of Block 1 (week 9 of the internship). We (the other internees and I) started to plan out the interviews that we would be conducting with Calculus 1 students, owning the fact that now we were almost satisfied with the amount of literary research we had done and with the library of Existing Practices we had made. The first step was to briefly review what we knew about the structuring of an interview. For this we talked to some students that had taken courses in "Qualitative Methods" and got recommendations on what written guides to look through in order to prepare for the interview designing process.

The initial thought was that we would interview both Calculus 1 students from UCG and from outside of UCG, in order to compare their experiences when taking the course. However, when we tried to formulate the rationale behind this idea, interviewing both groups of students didn't seem like it would give much insight, since the project only encompassed the Calculus 1 course at UCG. So, after taking this decision we finished writing the interview structure and received feedback from the internship supervisors and from Lucy Avraamidou. We interviewed a total of 6 UCG students and we spent two weeks conducting, transcribing, and analyzing these.

At around the same time that the interviews were being held and worked on, I also attended the expert panel webinar of *Identity Development and STEM Learning* by the organization of Multiplex which Lucy had informed me about which was highly relevant and engaging to watch. Also, during this time approximately we were finishing constructing another survey which was to be sent to all Calculus 1 students (even those outside UCG). The protocol we had been designing went back and forth some time between the internship supervisors and the internees in order to perfect it as much as possible and finally it was ready to be sent out to the students. Oksana Kavatsyuk was the contact person between the project and the dean of UCG Hanny Elzinga, which offered her networks to facilitate the dispersion of the survey and provided connections to the other faculties.

Once the survey and interviews with the students were finalized, we began to consider interviewing/conversation with Oksana Kavatsyuk too. Our motivation for this was that not only

would there be things that would be interesting to ask her too, since she has been the professor of the Calculus 1 course, but also we considered that it could be worthwhile for us to share some of the insights from the students' interviews with her. The protocol was concluded and a fellow internee (Adela Ostaf) and I set an appointment for this interview. It was indeed an absorbing conversation and I believe it proved useful both for the internship's goals and for Oksana herself.

The last weeks of the internship acted as an encapsulation and conclusion for all the work we had been doing. The survey was sent out and distributed to students from different faculties, their answers were recorded and analyzed and the transcription and examination of the interview with Oksana was completed. In order to produce a finalized outcome for our work, we decided that our last mission would be to compose a Glossary in which we would annotated the key terms that had been relevant in the research and that we thought would be useful for any individual that would want to get an understanding of the project and of the fields. We assembled a list of terms that we took from the readings and other content that we had consumed throughout the internship. I trust that there was a strong rationale behind this idea, since it would already encompass in a very summarized way a lot of the work we had been doing. By the very end of Block 2 a few extra interesting opportunities and tasks had arisen. As internees we would no longer be active participants in these activities (since our internship time was already over), however we still became acquainted with some of the ideas for future plans for the project. This was quite gratifying, since I had the chance to visualize what the future of the Comenius project held.

REFLECTION

In this section of the report I will like to reflect on various different aspects of the internship. Firstly I will be discussing my personal learning process throughout the internship, making reference to the goals and plans I formulated for this process in the Learning Plan. Secondly I would like to briefly address the practicalities of the internship itself: how was the interaction with the internship supervisors? Did the internship fulfil my expectations?

LEARNING OUTCOMES

At the time I was writing my Learning Plan I definitely had one main aim in mind in terms of professional learning goals: I wanted this internship experience to give me the opportunity to acquire the skills necessary to undergo high-quality academic research in the fields associated to the project (Gender Studies, Science Education and Communication, Identity Development...). The way I had envisioned I would do this included observing my supervisors and peers so as to gain an understanding of how individuals interact in a team with a common professional goal, how

qualitative research is conducted and above everything, how to properly communicate your research and work to people, either peers or externals. Thinking back at how I implemented this during the course of my internship I realize that what I had envisioned doesn't completely correspond to what I was doing. Firstly, the communication aspect came a lot easier to me than I had expected, which meant that I hardly focused on becoming comfortable with this and instead centered my attention on how my supervisors were expecting us to do our research. This came as a surprise and was consolation, since before I had started the internship I had feared that I wouldn't be competent enough in my communication skills, as I had never worked on a research project alongside professionals before. Once I started realizing I was more at ease than I had thought I would be, I could focus more on the research and data analyzing skills I had also hoped to gain.

An additional professional learning goal I had set for myself was to learn to produce reports and reflections on my work. Throughout the development of this project I have been constantly reporting to my supervisors on any updates related to my research or to tasks I was undertaking with my peers, which I believe has definitely helped me develop this skill. In addition to this, the writing of this final internship report has in itself been a big challenge for me, as I had never produced one before. The learning process behind this report was very interesting, since I have had to discover what an internship report should entail and what is expected from them.

In terms of my more generic and personal learning goals, my principal objective for this internship was to experience how organization skills should look like in the professional world. Some of the tasks I have completed that I believe have helped me gain an insight into how individuals organize themselves and administrate their work in the labor market is to give structure to the work I had to do in respect to the time I possessed to do it. During this internship there have been moments in which many chores had to be done in a short period of time and I had to prioritize depending on what people were asking from me. I had the responsibility to deliver a piece of work at a particular moment and had to learn to fulfill this responsibility.

GENERAL INTERNSHIP EXPERIENCE

The way I received this internship opportunity was a complete coincidence and very fortunate for me, since It almost seemed that the vacancy had reached me at the perfect moment. In times where almost nothing is certain and plans keep changing, I felt very grateful to have encountered an opportunity as upstanding as this one, especially in the situation I was in before finding it, when my Erasmus plans had just been cancelled.

From even before the internship began I already had high expectations of what it was going to be like working with the two UCG professors Oksana and Maria, and these were definitely not unfulfilled. Working with Oksana Kavatsyuk and Maria Ioannou has been an absolute pleasure. They are both very determined and ambitious people and from the start I could predict that their

passion for the field would be contagious and motivating for myself as an internee. Communicating with them was also a pleasant chore. Even if at first I was unsure on how to direct these interactions as I had never had this kind of position before the communication with them was straightforward and reassuring. Whenever I updated my supervisors on our progress or I asked about advice and directions their answers always came fast and were supportive, which was very gratifying at work. In general, all particular aspects of my experience in this internship were adequate and I was fortunate enough to not have to confront any challenges related to the facilities or my supervisors, and was allowed to focus completely on the tasks that the research provided me with.

CONCLUSION

This internship has helped me reach some learning goals that I believe are essential for any position in the labor market. It has exposed me to the understanding of what good organizational and management skills look like. It has taught me how to direct communication between peers and between supervisors. It showed me act accordingly in a team that is working on academic research. But, above all, this internship has introduced me to a topic and a global issue that I was rather unfamiliar with and that I am confident will be recurrent in my future. Although I had always been interested in the communication of science and the subjects surrounding gender and inclusion, this experience has changed that interest and curiosity into knowledge and awareness, and the desire to keep learning about this subject.

Since the internship ended, I have decided to write my Bachelor's thesis on Gender inclusivity on science, since I have found some of the concepts and topics that I have been introduced to during this experience extremely interesting and worth examining further.

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APPENDICES

APPENDIX I: *Learning Plan, professional and generic learning goals*

Professional learning goals	<ol style="list-style-type: none">1. One of my main learning objectives is that I would like to learn how to conduct high-quality academic research together with a group of people. In order to achieve this I will take as much notice to my internship coordinators when in meetings so I can observe and learn how they communicate professionally with the rest of a group. By observing I will be able to take notes and put these into practice in any group meeting or teamwork procedure we complete. Furthermore I will ask my coordinators for feedback after such meetings to be able to evaluate my performance and further develop this skill.2. Another goal I have set for myself is to gain knowledge in data analysis and manipulation, which will be present in all the research tasks. The way I plan to achieve this is by checking relevant sources (such as research papers in different fields) that will serve as examples on different ways you can analyze, manipulate and present data. I will need this skill more in my final reports and this will be the way I will evaluate how much I have achieved this learning goal.3. My last professional learning goal is to learn how to form a good report. This will of course be necessary for my evaluation on the internship but I also expect to be writing many different reports in which I will describe my latest work, research or even just updates to my coordinates. I believe these will serve as practice, since I will have direct feedback from my peers. However, I will also have the change to make progress in this skill not only from feedback from my peers but also from the other internees in this internship position. By communicating and reporting to them too I will also have constant feedback from them.
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<p>Generic learning goals</p> <p>See the course guide for examples of formulations.</p>	<ol style="list-style-type: none"> 1. This is the first internship I will be working in so I think this first experience in the professional field will be the perfect opportunity to learn some generic skills that are essential in the labor market such as organization (both of time and of the tasks that I will be fulfilling), assertiveness and responsibility. I plan to develop my own method of task organization during the internship. I will do so by taking clear notes of all the tasks that I or my internship coordinators have set for me and my team and actively keep up to date with all the research/work. This of course includes all the meetings and planned group activities. By keeping a good track of everything that is going on there will be no problem with punctuality, being responsible and professional in the way tasks are finished and completing everything I set out for myself. 2. I also want to improve my group working skills and cooperation in a team. To do this I am planning on being assertive in any group setting and I will write a reflection after every meeting with our internship coordinators in which I will write anything I learnt about how to behave in a professional group environments (such as ways to direct myself to team mates and peers, best questions to ask about someone's work, ways of using constructive criticism...). These reflections will hopefully serve as a learning process for myself.
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