

Teaching portfolio

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This portfolio consists of five parts; a *Teaching biography*, a description of my *Teaching principles* including four cases where I try to show some of my teaching principles in action, a description of how I picture my *Future Teaching development*, some *References* and finally an *Appendix*.

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1 Teaching biography

After the second year of my undergraduate studies I decided to take time off from my studies to teach physics in my old elementary school. Looking back it is kind of mad that a 22 year old with no teaching experience was given this job but the school's physics teacher got sick just before the school start and it was difficult to find teachers with such a short notice. This period of my life turned out to be one of the most difficult in my life but also the one of the most enjoyable. After this time I was certain that I wanted to make teaching a big part of my future carrier.

After finishing my undergraduate studies in mechanical engineering and a master studies in applied mathematics I started a PhD in biostatistics at the Technical University of Denmark. I was working with a big drug company but after few months it was clear working such a company involved a lot of waiting for data which meant that I was unable to do any analyses for a long time. Luckily for me there was a big need for teaching assistants at my department so instead of working on my project I worked as a teaching assistant in almost all the courses my department offered. I absolutely loved the job just as I had loved the job at my old elementary school. After a few semesters my interest in biostatistics had decreased and when I saw an advertisement for a PhD position at the University of Iceland (UI) involving development of an online learning environment to teach mathematics and statistics I decided to move back home to Iceland. I started the PhD in 2010 with professor Gunnar Stefánsson as my supervisor. At the beginning of the PhD there was a need for teachers to teach an introductory course in statistics for around 100 students (LAN203G). Gunnar had another PhD student at the time, Sigrún Helga Lund, and we decided to teach the course together. This was the start of a fantastic partnership between Sigrún Helga and I. We really enjoyed teaching the course and taught several courses together during our PhDs and after getting positions at our institutes. We have also produced quite a lot of teaching material together (see Section 2.3).

When I finished my PhD in 2015 I got an Adjunct position at the School of Engineering and Natural Sciences (SENS) that became a Associate Professor position in 2017. A part of my job for the first couple of years was to work on several educational development projects for the school (I will discuss some later in the portfolio). I was also the chair of the Teaching Committee of SENS and the schools representative in the University Academic Affairs Committee until the end of 2018, which I enjoyed a lot.

Since my first teaching experience at the UI I have taught 14 different courses at SENS, alone or together with colleagues. Seven of these courses are undergraduate courses and seven graduate courses. Four of the courses have more than 100 students enrolled with the largest courses with over 300 students. These large courses (STÆ105G, STÆ108G, STÆ203G, STÆ209G) are introductory calculus and statistic courses for first year students in biochemistry, biology, computer sciences, engineering, food science, geology, geography, mathematics, physics, nutrition and tourism studies. The results of the *Teaching and Course Evaluation Survey* for the two courses I taught this semester can be seen in Appendix 5.1.1. Results from more surveys can be provided upon request.

I have supervised four master level students and I am currently supervising three more, some I have supervised alone and some with colleagues. Five of these students were/are working on projects related to teaching and learning.

Finally I would like to mention that I was honored with the SENS teaching award last semester which I am extremely proud of (see Appendix 5.2).

2 Teaching principles

My first years of teaching I was very focused on explaining everything in detail to my students. I was often very surprised when grading their homework and exams that they were not able solve problems that I was convinced that I had explained to them so well how to do some days or weeks before. I was also struggling with several other things such as assessment in the large student groups, I had difficulty engaging the students in the classroom and found it difficult to teach large student groups with very different mathematical background. I was also unhappy with some of the teaching material that I was using. Luckily I heard about a new program Guðrún Geirsdóttir and her colleges were starting, *Teaching studies for higher education*, which I enrolled in. This turned out to be a great decision, the program was extremely useful. It was fantastic to get to know other teachers in the program with similar interest and Guðrún and her colleagues did an excellent job of getting us do rethink our teaching while introducing us to research on many of the issues we had been struggling with in our teaching. I am especially thankful for getting to know Margrét Sigrún Sigurðardóttir, an Associate Professor at the School of Social Sciences in the program. We have spent endless hours talking about teaching and learning and we are working on several projects together at the moment related to teaching and learning (more about that in Section 3).

Since I teach a lot of first year students I have also taken courses at the UI that are a part of a degree in *Upper secondary school teaching* to get a better insight into the upper secondary school level. Theses courses have also helped me a lot in my teaching at the UI.

If I should name one thing that has effected me the most from the *Teaching studies for higher education* studies it would be to get to know the *Scholarship of teaching and learning* approach [Felten, 2013] which has changed the way I approach my teaching. When I for example try out something new in my teaching I start by looking into the literature (something I did not do before). I then try to find the best way to involve my students (using focus groups, polls, ... - another thing I did not do before). As with any other research I then do my best to document the process and evaluate the results. Examples of this way of working can be found in the cases presented below. I have also included a list of 14 journal- and conference papers (see Appendix 5.3) I have written with my colleagues on teaching and learning related issues (results of "going public").

As I mentioned in the *Teaching biography* I got the opportunity to work on several projects related to teaching and learning at SENS for couple of years. One of theses projects was on how to welcome first year students to the university and try to find a way to prepare them for the studies they had chosen. Reading about research on *threshold concepts* and *troublesome knowledge* [Meyer and Land, 2005] in my pedagogy studies helped me a lot in this work and made me rethink how I teach courses for first year students. Case 1 (Section 2.1), presented below, touches on the issues discussed in this paragraph.

Reading papers on *summative and formative assessment* such as [McTighe and O'connor, 2009, Wiliam, 2013] and about the importance of *feedback* [Black and Wiliam, 1998, Nicol and Macfarlane-Dick, 2006] during my pedagogy studies had

a big impact on the way I have approached assessment since. Texts on *deep and surface learning* [Biggs, 1999, Entwistle, 2009] were a true eyeopener and Bloom's Taxonomy [Kratwohl, 2002] have helped me a lot planning and the learning activities in my courses. I remember getting a bit of a shock when I took an old exam and labeled the questions according to the taxonomies - way to many of the questions were in the lower levels of the triangle. Now I try to keep the taxonomies in my mind when making assignments for pushing myself to make assignments that enhance high level learning. An example of an assignment where I have categorized the different parts according to the taxonomies can be seen in Appendix 5.4.1 (in Icelandic). Discussions and papers on the importance of activate students in the classroom as well as how to do that [Swan, 2005] have changed the way I use the valuable time I get to spend with students in the classroom. Case 2 (Section 2.2), presented below, touches on the issues discussed in this paragraph.

I believe that education should be available to everyone and I have therefore made an effort to have the teaching material I make publicly available. This includes two textbooks, around 200 videos on youtube and thousands of exercises in the tutor-web system (the system I worked on during my PhD). A brief description of the material and how it became to be is given in Case 3 (Section 2.3).

Finally, in Case 4 (Section 2.4) I describe some work I have done together with my colleagues on study programs and course development.

2.1 Case 1: Welcoming and teaching first year university students

After teaching my first introductory statistics course for first year university students I realized that the mathematical background of our first year students is very different. A colleague, Rögnvaldur G. Möller, had for some years conducted a status exam in mathematics administrated to all first year students at SENS at the beginning of the first semester. The results of these exams confirmed that a big part of our students were struggling a lot with secondary school mathematics. I got involved with the work on the status exam in 2012. A description of the exam along with the students' performance and how well it predicts students' achievements in their first year calculus courses can be found in [Jonsdottir et al., 2013].

The results of the status exam were not used in a systematic manner to start with but I got the opportunity to change that when I was hired by SENS to work on educational development projects along with my teaching for couple of years. We started by setting up a series of problems the students could use to test their abilities in the tutor-web system (the system I worked on in my PhD) during the summer before they started their studies. The students then got a message on how they could prepare for their new studies depending on how well they did. Unfortunately it was difficult to reach the students during the summer and only a small part of the group followed the guidelines we provided.

In 2017 the Department of Mathematics got a grant from the UI Academic Affairs fund to make teaching material designed to help first year students prepare for their studies at SENS. I was together with two fantastic colleagues, Benedikt Steinar Magnússon and Sigurður Örn Stefánsson, responsible for the project. We hired four math students to work with us during the summer on preparing the material. We decided to allow the students to take the front seat in the work, after all they were the experts in what would help first year students the most to prepare for their studies. It was decided to publish material on an open

web with a mix of text and videos. Luckily another colleague had written a short textbook on secondary school mathematics that we used and adopted but the students made all the videos themselves. We used a great system Benedikt had developed, Edbook, to publish the material. The result can be found here: [Undirbúningur í stærðfræði](#). Early on in the process we made a list of what we considered to be *threshold concepts* and made sure that the material covered those. In addition, thousands of exercises in the tutor-web were linked to this material that the students could work on. I consider this project to be a great success. It was absolutely fantastic to work with the students that did a great job that summer. In a poll among the first year students over 90% of them stated that the material and the exercises in the tutor-web had been helpful when preparing for their studies.

A big change in the upper secondary school system was made in 2014 when it was shortened from four years to three. In many of the schools the first cohort in the new system started in 2015 and graduated in 2018. This meant that even more students were expected to start their studies at SENS that year and a big part of the group had taken fewer math and physics courses than the rest of the group. During this time I worked closely with Sigdís Ágústsdóttir, Education Manager at SENS. We decided make ambitious agenda for welcoming the first year students that we got a grant for from the UI Academic Affairs to prepare. Again we hired students to work with us during the summer which again was a fantastic experience. We planned a tree day *Nýnemadagar* (first year students days) including math, physics and computer sciences workshops, prepared by academic staff and students, as well as short lectures on practical stuff (such as the learning management system used by the UI). The last day the students took the math status exam and after that we had a big barbecue. The day after the students got to know how they did on the status exam and were offered to participate in a refresher course in secondary school mathematic in the following week. A more detailed description of the project can be found in Appendix 5.5 (the article was published in *Tímarit Kennslumiðstöðvar* but the issue does not seem to be available on the homepage of Kennslumiðstöðin so I have included it in the Appendix). A similar program was offered to the first year students the following year but due to the pandemic it was not possible to do so in 2020. Instead of welcoming them on campus a Canvas course was prepared including all the teaching material that had been developed the following year.

Every year since I started teaching as SENS I have taught at least one introductory course in statistics or calculus (often both). As stated above the mathematical background of the students varies a lot. It has been extremely useful to be able to point the students to the teaching material (now a Canvas course) that was developed in the two projects described above. It is clear that a student that does not have a solid background in algebra will have great difficulties working with more advanced topics within calculus and statistics but the *Nýnemadagar*, the refresher course and the teaching material has made this less of an issue but there is definitely more work needed to make the transition from the upper secondary level to the university level better for our students (more about that in Section 3).

2.2 Case 2: Teaching large student groups

Many of the first year courses offered by SENS are quite large in terms of registered students. In some of the courses I have taught the number is often around 300. All sorts of challenges

have come up but I soon realised that with such a large student group it has to be very clear from the start how the courses are structured and what is expected from the students. In a typical course schedule I tend to include a short description of the course, the learning outcomes, teaching material, the structure of the classes, software used in the course, how assessment is carried out, how many hours they should expect to use working on the course, the best way to contact me for questions and finally some description of some sort of a forum, often focus groups with at least one student from each study program participating in, where we can discuss on a regular basis how the courses is going. As an example, a part of course schedule can be found in Appendix 5.6.

Below I will discuss two issues I have struggled with when teaching large student groups, *engaging students in the classroom* and *assessment and feedback*.

Engaging students in the classroom

My first years of teaching I put a lot of work in my lecturing. I thought a lot about how I could explain various concepts to students in the best way possible. I was very focused on what *I* was doing in the classroom but almost did not think about what the *students* sitting in front of me were doing. *Student centered learning* was an unfamiliar approach to me back then but as stated before, taking courses in pedagogy helped me a lot to think differently about the time I spent in the classroom. I tried to spend more time on talking *to* the students, not just talk *in front* of them, and give them time to discuss in small groups (*Think, pair, share!*). I really wanted to spent more time like this in the classroom but I often felt the need to stop these sessions so I was able to "cover all the things" that were on the agenda that week.

I remember feeling a Eureka moment when I first read about the *Flipped classroom* and I decided to try to apply the method in introductory courses in statistics (LAN203G/STÆ209G). I made videos and notes for the students to study before they came to class and all of a sudden there was so much time to spend in the classroom! I could for example allow myself to spend time discussing various things that were going on in the society that week, such as elections, and link that to the weeks' material. The last year has been exceptionally interesting since almost everything related to COVID-19 covered in the news has a statistical aspect to it. I also wanted to get the students to be active during class and after some googling I found a software, Socrative ([socrative.com](https://www.socrative.com)) which turned out to be exactly what I was looking for. Using the software it is possible to send questions to students' devices (computers or phones) during the classroom (open or multiple choice) and see their answers in real time. This way it is possible to get an instant measurement on how well the the group has understood some concepts. These questions can be prepared beforehand or produced during class. Couple of minutes from one of the first classes I used Socrative are shown in the video below:

Monday morning class - STÆ209G

Since I changed to the flipped classroom in these courses the comments in the *Course Evaluation Survey* regarding the method have always been very positive and more students show up to classes. The students also hand in better assignments and solutions on exams but other things have changed in the courses as well so it is not possible to state that this

positive effect is due to the change to the Flipped classroom method.

When the pandemic hit us in 2020 and the UI was closed I was teaching a large introductory course in statistics (STÆ209G) that I had already "flipped". It was actually quite easy to change the course to an online course. After number of conversations with the students we came up with a plan on how to structure the course which was pretty much the same as when they could show up to classes. A special *Teaching and Course Evaluation Survey* was conducted after the semester that revealed that the students were happy with the result (see Appendix 5.1.2).

Assessment and feedback

Since starting teaching at the UI I have always taught at least one course including more than 100 students per year (most years I have taught courses with 200 - 350 students enrolled). Being aware of the importance of giving students *feedback* on their work I really wanted to find a way to do that in a manageable way. In my PhD I worked on developing a learning environment, the tutor-web, for teaching mathematics and statistics together with prof. Gunnar Stefánsson. In the beginning students were allocated multiple choice questions randomly on a specific topic and after answering a question they could see if their answer was the correct one or not. I used the system for couple of years this way for homework and used the grades they got as a part of their final grade. This decreased the workload on me and my assistant teachers a lot since before the students handed in written solutions every week that we corrected and graded. The graded solutions were then left at a certain place so the students could pick them up. It was always quite sad to pick up piles of graded solutions that had not been picked up at the end of the semester knowing about the amount of work that went into grading them.

The students were quite happy with the tutor-web system but often pointed out that it would be good to see *why* their answer was incorrect not just knowing *if* it was incorrect or not. We therefore decided to add an explanation to the questions in the system that the students could see after answering a question. This has been a lot of work but currently we have thousands of problems in the system including detailed explanations.

Another issue that the students often mentioned was how discouraging it was to start an assignment in the tutor-web and getting questions that were too difficult. To respond to that we designed an algorithm that picks appropriate questions to students at a given timepoint, that is a student gets easy questions to start with but as their grades go up the difficulty of the questions increases. A more detailed description of the algorithm and other features of the system can be found in [Jonsdottir et al., 2015].

In order to see the impact of the changes we did to the system and to investigate difference in students' learning, measured by how well they did on exams, after doing regular homework (graded by a teacher) and homework in the tutor-web we conducted a controlled experiments over four years. The results were pleasing, we noticed an increase in students' learning after the changes we made to the system and students did better on exams after working in the tutor-web system than after doing regular homework [Jonsdottir et al., 2017].

The tutor-web system has not only been used at the UI. It has been used in some upper secondary schools in Iceland and in schools and universities in Kenya. This cooperation with schools in Kenya has involved several trips to Kenya where Gunnar and I have stuffed

suitcases with tablets with the tutor-web installed and given them to learners in Kenya. This cooperation with the schools in Kenya has been absolutely fantastic and made us realize that so many things that we complain about the school system in Iceland are perhaps not that big of a deal. A description of the project can for example be found in [[Jonsdottir et al., 2019](#)]. With grants from the university, Ministry of Foreign Affairs and others we have managed to raise money for hundreds of tablets and given them to learners in Kenya.

2.3 Case 3: Development of teaching material

As I mentioned before, Sigrún Helga Lund and I taught an introductory course in statistics together when we were about to start our PhDs. We used a standard textbook from the US that is often used in this type of courses and had been used in the course for some time. We soon realised that we were not happy with the book. It was very focused on *how* to use all sorts of methods and included long explanations on how to do that. We could also see that the students were struggling a lot reading it because of language problems. We therefore decided to write a textbook in Icelandic designed for first year university students, *Tölfræði frá grunni* [[Jonsdottir and Lund, 2011](#)]. When writing the book we focused on discussing *why* and *when* to use the different methods not just *how* and to provide real world examples that the students could relate to. The first version came out in 2011 but we then published a revised version in 2013. In a poll from 2013, 92% of the students marked that they believed that the book was good or very good, 6% believed it is neither good or bad, no student thought it was bad or very bad and 2% of the students had not used it. The book has been used in at least three of the public universities and the first chapters have been used in several upper secondary schools. The book is in an open access and is available to everyone as an e-book here: [Tölfræði frá grunni](#)

Sigrún Helga and I share a common vision regarding what kind of software universities should introduce their students to: If you can find as good (or even better) open source or free software than a commercial product students should get introduced to the open source/free one. When we took over teaching of the introductory statistic courses in SENS students were being introduced to commercial products that very few of them would have access to after graduation. We therefore decided to start to teach our students to use R [[R Core Team, 2020](#)], a free software environment for statistical computing and graphics. We also decided to write a book that would accompany *Tölfræði frá grunni* in a good manner. We got another fellow PhD student to write it with us, Bjarki Þór Elvarsson, and in 2015 *R frá grunni* was born. The chapters in the two books have the same names so it is easy for students to link the theory from *Tölfræði frá grunni* to how it is done in R in *R frá grunni*. The book is in an open access and is available to everyone as an e-book here: [R frá grunni](#)

Sigrún Helga and I have also made hundreds of videos and made them publicly available. Below are links to three youtube playlist linked to the *Tölfræði frá grunni* and *R frá grunni* material. The videos have gotten thousands of views. We have heard many stories from people outside of the universities that have used our videos to strengthen their statistics background and to learn how to use R (which makes us very happy).

[Lectures on theory](#)

Calculations

Lectures on the statistical software R

We also made an edX Edge course on how to use R that anyone can enroll in:

edX course in R

Finally I would like to mention that the [tutor-web system](#), the system I have worked on with Gunnar Stefánsson and others, is open source and free of charge to use to any learner. In the system learners can access on thousands of exercises in statistics and mathematics and get instant feedback on their work.

2.4 Case 4: Study programs and course development

Since I started working at the Faculty of Physical Sciences I have been involved in the development of two new undergraduate programs and two graduate programs. A description of the programs and how they came to be is provided in this case.

Applied Mathematics

When I started working for the Faculty of Physical Sciences it offered only one undergraduate program in mathematics which is focused on theoretical mathematics. This had been the case since the faculty was founded. In 2014, the faculty got a special grant to, among other, increase the number of math students. One of the ideas was to offer a new program in [Applied mathematics](#) which had often been discussed within the faculty in the past without any conclusion. A group was assembled consisting of both new and older members of the faculty and together we designed a new BS program with two specifications, *Modeling and Scientific Computing* and *Statistics and Data Analysis* (we later added one more, *Financial Mathematics*). I was responsible for making a draft for the *Statistics and Data Analysis* specification which was a dream come true since I was able to put together a program that I had wished for when I was an undergraduate student. At that time I really wanted to study mathematics but I wanted a more practical approach than was offered back then (I was not the only one) and decided to study engineering instead. The *Applied Mathematics* program has been a great success with around 30 students enrolled each year (similar number of students as the traditional math program has).

Mathematics and Mathematical Education

During my PhD I was lucky to be a part of a fantastic group that was appointed by the Ministry of Education, Science and Culture to review mathematics education at the upper secondary school level. We visited many schools, interviewed teachers and students, followed classes and finally published a report [[Jónsdóttir et al., 2014](#)]. One of the findings we made was that there is a big need for math teachers at the upper secondary school level that have a degree in mathematics. In many of the schools there was not a single teacher with a math degree. In an attempt to increase the number of teachers with a math degree it was decided to form yet another undergraduate program, [Mathematics and Mathematical Education](#). We were four academic staff in the group, two from the Faculty of Physical Sciences and

two from the School of Education. The number of students enrolled have not been many, around three per year, but all the students that have graduated so far are now enrolled in a master program to get a teaching license or have already started teaching at the upper secondary level so we consider this program to be a great success.

Mathematics Education for Upper Secondary School Teachers, Postgraduate Diploma

The very good cooperation between the Faculty of Physical Sciences and the School of Education when forming the *Mathematics and Mathematical Education* program continued the following year when we decided to design a 60 ECTS postgraduate diploma for upper secondary school teachers in mathematics, [Mathematics Education for Upper Secondary School Teachers, Postgraduate Diploma](#). The program was designed for teachers that did not have a degree in mathematics and wanted to strengthen their mathematical foundation. The program has only been offered once, in 2016-2017 but will be offered again next year. Around 20 teachers finished the program. I designed and taught two courses for the program together with a colleague at the University of Akureyri, Auðbjörg Björnsdóttir ([Statistics and the teaching of statistics - SSF103F](#) and [Inferential statistics - SSF304F](#)). I really enjoyed taking part in designing this program and teach the courses especially since it gave me the opportunity to get to know this group of fantastic teachers. I believe it is very important that there is a good cooperation between the two school levels, the upper secondary and the university level, so that the transition between the two levels is a pleasant for students as it can be. In my opinion this program certainly helps achieving that goal.

Master in Applied Statistics (MAS)

Gunnar Stefánsson had for some years wanted to start a master level program in applied statistics when Sigrún Helga Lund and I started our PhDs under his supervision. The idea was to offer a program for students, not necessarily with a background in math or related fields, that wanted to straighten their statistical skills. Every year there is more and more demand for people that can analyse data on the job marked so we all believed that there is was a strong need for this [MAS program](#). The three of us worked together on designing the program and the first cohort started in 2016. The student group in this program is very different from other master level programs of the faculty, with almost all the students working close to full time along with their studies. Every year there have been around 20 enrollments making it the most popular master level program of the faculty. However, only around 10 students have graduated from the program yet and five more are finishing this spring. A large number of students have finished all the courses needed but are struggling to finish their theses. We are currently discussing ways to give the students more support to finish their theses that we will hopefully be able to implement in the upcoming school year.

In relation to the new program Sigrún Helga and I designed four new courses from scratch, [Applied data analysis - MAS202M](#), [Statistical Consulting - MAS201M](#), [R for beginners - MAS103M](#) and [R Programming - MAS102M R Programming](#). These courses have not only benefitted the MAS program since students from a number of programs within UI take these courses every year.

3 Future teaching development

In this section I will discuss some of the issues and projects I would like to work on in the upcoming years. There are more, but these are on the top of the list.

Improve the quality of assignments

As mentioned earlier I believe I have benefited a lot from the pedagogy courses I have taken. The courses as well as many discussions with my colleagues and students have made me rethink the assessment part of my teaching including making assignments. I have already discussed how we have changed the tutor-web and in the future I want to work more on other types of assignments for my students, below is one example.

I was very excited to try out an assignment I made as a part of one of my pedagogy courses when the pandemic hit us that involves the students working together in groups in the classroom, providing peer-review to each other, discussing the results, agree to a solution and presenting their results to their fellow students. I had just read [Swan, 2005] which is full of ideas on how to activate student groups in the classroom and we had just been introduced to the *Common Core Standards for Mathematical Practice* [National Governors Association Center for Best Practices, 2012] in the course. These "set of high-quality academic standards in mathematics" from the US which I used as guidelines when making the assignment. Finally I was inspired by Liljedahl's *Thinking classroom* [Liljedahl, 2016] a method I would very much want to apply in my teaching in the future. A detailed description of the assignments can be found in 5.4.2 (in Icelandic). The students take the roles of a statistical consultant in the assignment. They get descriptions of eight real world cases and they need to figure out how to translate those to problems they can solve using methods they have learned in the course. I am very excited to try this out in the classroom when the pandemic is over and if everything goes well make more similar assignments in the future.

Workload

I am interested in looking more into our students' workload. I find this important since I am worried that because of too much workload we might be pushing our students toward surface approach to learning. Informal discussions with other teachers indicate that teachers do not think much about the time students spend working on their courses and if it is in accordance to the number of ECTS. I have already conducted a pre-study together with Sigdís Ágústsdóttir Education Manager at SENS where students were asked to register the number of hours they spent working on their courses using an app. I am looking forward analysing this data and to conduct a larger study to investigate this important issue.

Transition from upper secondary school to university

I am passionate to make the transition from upper secondary school to university better than it is today for our students. I believe that the key to that is a better cooperation between the upper secondary school level and the university level. I think that the *Mathematics Education for Upper Secondary School Teachers* program discussed in Section 2.4 is a good platform

for that. I have also been involved in shorter workshops for upper secondary school teachers on various topics which I have enjoyed a lot. I am for example very excited to introduce new features we have implemented in the tutor-web to upper secondary school teachers that allow students to solve problems on real data that they either import themselves into the system or get from open databases in the system. A description of these features can be found in [Jonsdottir et al., 2021]. We had planned workshops for the teachers just when the pandemic hit us to introduce these new features, hopefully we will be able to give the workshop next school year.

Student evaluations of teaching and students' social networks

As mentioned earlier I was lucky to get to know Margrét Sigrún Sigurðardóttir in the *Teaching studies for higher education* program. We are currently working on two educational development projects together with other colleagues. The first project involves analysis of data from the Teaching and Course Evaluation Survey at the UI. This collaboration has resulted in one submitted paper and we are currently working on two more. Our findings suggest that the survey we are using at the UI has many flaws so we are hoping that our findings will help improving the survey. The second project involves investigating our students' social networks. We have already one accepted paper that has not been published yet and we are currently working on two more. We are hoping that our findings will help the deans of the UI to see the importance of strong networks among our students and to support projects designed strengthen those. I am sure that these two projects are just the first of many that Margrét and I will be working on together in the future.

4 References

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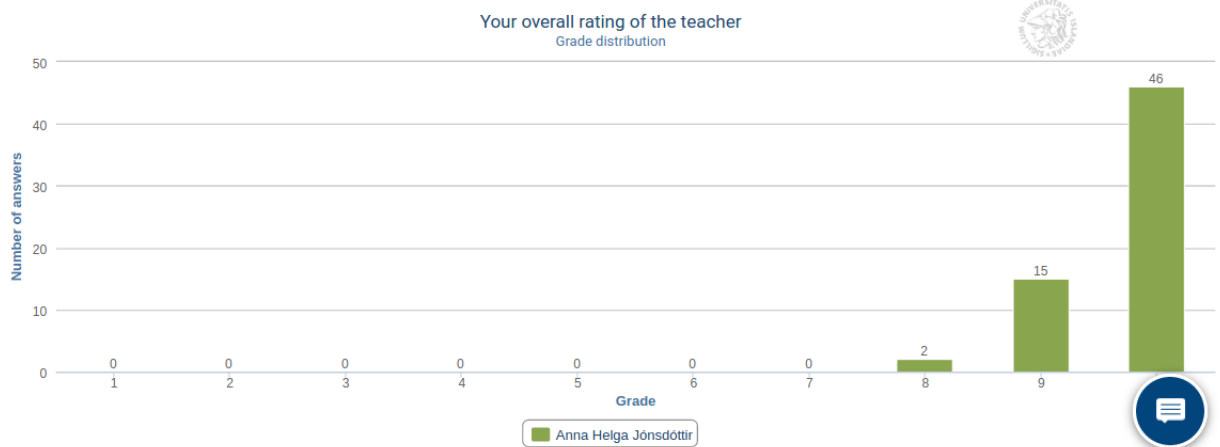
5 Appendix

5.1 Teaching and Course Evaluation Survey results

5.1.1 Courses taught this semester (spring 2021)

STÆ209G: Introductory course in statistics

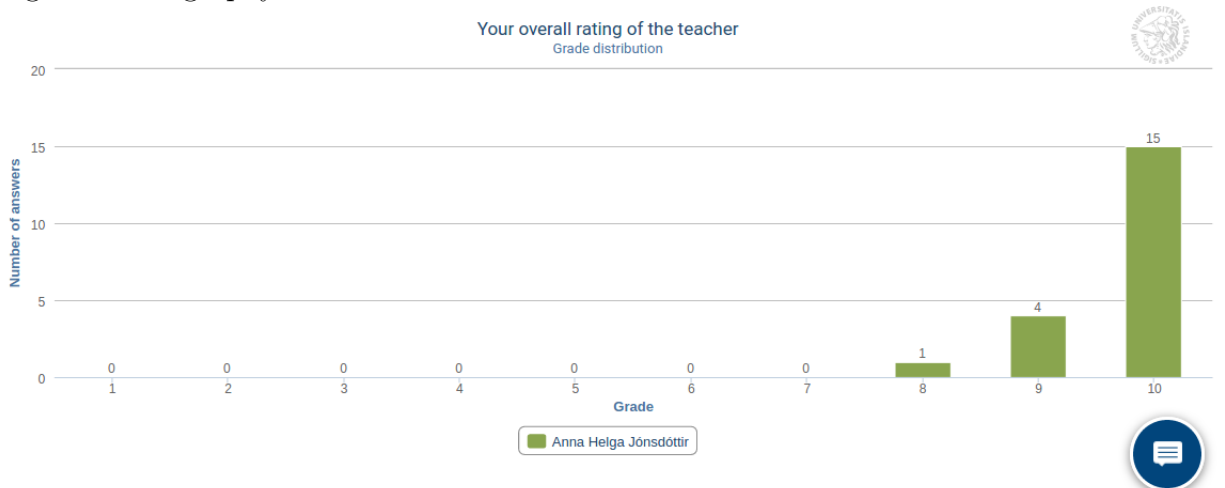
Study programs: Biochemistry, biology, computer sciences, food science, geology and nutrition.



Answers to open questions removed from this version...

LAN203G: Introductory course in statistics

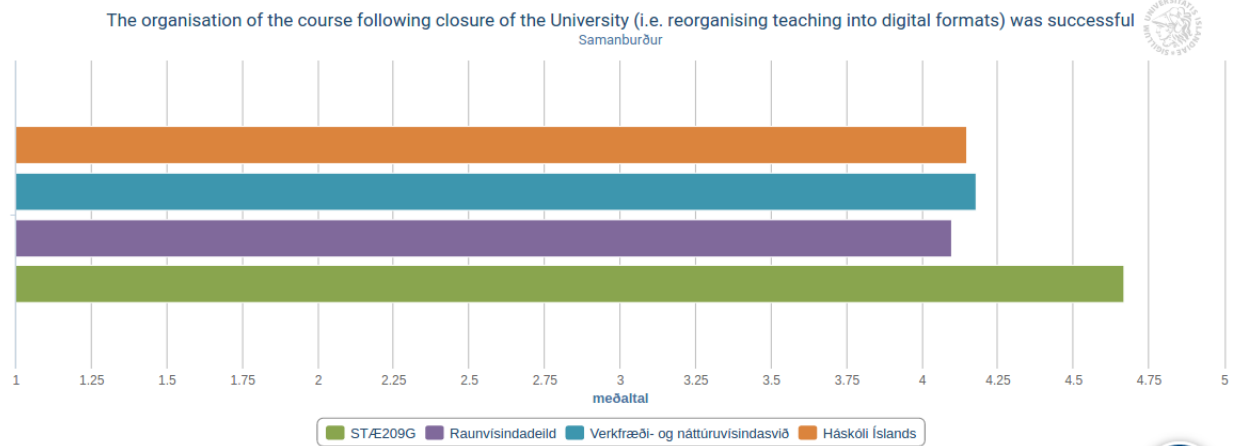
Study programs: Geography and Tourism studies.



Answers to open questions removed from this version...

5.1.2 Teaching during the pandemic

Below are the results of a special additional Teaching and Course Evaluation Survey for COVID-19 in STÆ209G (green bar on the chart) and answers to two open questions.



Answers to open questions removed from this version...

5.2 Teaching award





HÁSKÓLI ÍSLANDS VERKFRÆÐI- OG NÁTTÚRUVÍSINDASVIÐ

UMSÖGN KENNSLUNEFNDAR VoN

Anna Helga Jónsdóttir er afar farsæll kennari og hefur verið um árabíl. Hún lauk doktorsprófi frá Háskóla Íslands árið 2015. Um svipað leyti var hún ráðin í stöðu lektors við Raunvísindadeild, og til að sinna kennsluþróun á sviðinu, en hafði fram að þeim tíma sinnt stundakennslu.

Anna Helga hefur kennt fjölmörg námskeið í tölfræði og stærðfræði fyrir nemendur á öllu Verkfræði- og Náttúruvísindasviði. Hún er einstaklega vel liðin af nemendum og samstarfsfólki.

Anna Helga er annar tveggja höfunda vinsællar kennslubókar, Tölfræði frá grunni. Hún er og hefur verið ötull brautryðjandi í nýsköpun og nútímalegum kennsluháttum og er aðal drifjöður náms í hagnýtri tölfræði á meistarastigi.

Hún hefur haft yfirsýn um framkvæmd stöðumats í stærðfræði á fyrsta ári og þjónað í nefndum á vegum Menntamálaráðuneytisins til þess að meta stöðu og þarfir stærðfræðimenntunar á landinu.

Hún hefur einnig komið að þróun á móttöku nýnema við Verkfræði- og náttúruvísindasviðs með það í huga að gefa þeim tækifæri til að efla þekkingu sína og fá betri innsýn í þá hæfni sem þau þurfa að búa yfir áður en þau hefja nám við sviðið og þá sérstaklega þar sem raunvísindi spila stóran þátt í uppbyggingu náms.

Anna Helga var formaður Kennslunefndar VoN um nokkurra ára skeið, og stýrði störfum nefndarinnar við góðan orðstýr. Auk þess sat hún fyrir hönd sviðsins í Kennslumálanefnd Háskóla Íslands.

Að þessu sögðu telur Kennslunefnd VoN að Anna Helga Jónsdóttir sé einstaklega vel að þessari kennsluviðurkenningu komin, fyrir frábært og óeigingjarnt starf í þágu kennslu og menntamála.

5.3 List of my journal and conference papers related to teaching and learning

Journal and conference papers related to teaching and learning

- [1] A.H. Jonsdottir, J. Lentin, V. Calian, E.K. Hafsteinsson, and G. Stefansson. Using real data for statistics education in an open-source learning environment. *Teaching Statistics*, 42(1):5–12, 2021.
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- [3] G. Stefansson and A.H. Jonsdottir. Learning and evaluation without access to schools during covid-19. In *INTED2021 Proceedings, 15th International Technology, Education and Development Conference*, 2021.
- [4] A.H. Jonsdottir, J. Lentin, and G. Stefansson. Learning wherever, whenever: Education in a suitcase. In *Edulearn19 Proceedings, 11th International Conference on Education and New Learning Technologies*, 2019.
- [5] G. Stefansson, J. Lentin, Jonsdottir, A.H., and E. Hafsteinsson. From multiple-choice through free-text submissions and qualitative peer-reviews to grading students and reviewers. In *INTED2019 Proceedings, 13th International Technology, Education and Development Conference*, 2017.
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- [12] A.H. Jonsdottir and G. Stefansson. Using an online learning environment to teach an undergraduate statistics course: the tutor-web. In *Edulearn13 Proceedings, 5rd International Conference on Education and New Learning Technologies*, 2013.
- [13] A.H. Jonsdottir and G. Stefansson. A freely available cyber-university for personalized education. In *Edulearn11 Proceedings, 3rd International Conference on Education and New Learning Technologies*, 2011.
- [14] A.H. Jonsdottir and G. Stefansson. Enhanced learning with web-assisted education. In *JSM Proceedings, Section on Statistical Education: American Statistical Association*, 2011.

5.4 Assignments

5.4.1 Example of an assignment categorized using Bloom Taxonomies

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5.4.2 Example of an assignment used for formative assessment in the classroom

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5.5 Welcoming first year students

Umfiöllun: Móttaka nýnema



Móttaka nýnema á Verkfræði- og náttúruvísindasviði

Anna Helga Jónsdóttir, dósent við Raunvísindadeild á Verkfræði- og náttúruvísindasviði og Sigdís Ágústsdóttir, kennslustjóri við Verkfræði- og náttúruvísindasvið Háskóla Íslands

Í ársbyrjun 2018 fór kennslunefnd Verkfræði- og náttúruvísindasviðs (VoN) að huga að því hvernig sviðið gæti tekið betur á móti nýnemum sínum. Búið var við fjölmennum og fjölbreyttum árgangi nýnema haustið 2018 vegna styttingar framhaldsskólans og því var talið mikilvægt að standa vel að móttökunni. Meginmarkmiðið var að auðvelda nemendum þau umskipti sem felast í að hefja nám á háskólastigi, annars vegar með því að hjálpa þeim að kljást við nýtt og krefjandi námsefni en hins vegar með því að ýta undir tengslamyndun.

Af hverju er mikilvægt að taka vel á móti nýnemum?

Til að ná árangri í flestu námi sem boðið er upp á við VoN er mikilvægt að nemendur hafi góða þekkingu á framhaldsskólasterðfræði en sé hún ekki til staðar er hætt við að nemendur hætti í náminu (Anna Helga Jónsdóttir, Freyja Hreinsdóttir, Guðrún Geirsdóttir, Rögnvaldur G. Möller og Gunnar Stefánsson, 2013). Undanfarin ár hefur

námsbraut í stærðfræði verið með stöðumat í stærðfræði fyrir nýnema VoN. Tilgangur stöðumatsins er að kanna þekkingu og færni nemenda í ýmsum grunnatriðum námsefnis framhaldsskóla við upphaf náms. Prófið gildir ekki til einkunnar í námskeiðum sviðsins heldur er ætlunin að nemendur og kennarar þeirra sjái hvernig nemendur standa við upphaf náms. Árangur nemenda á prófinu er mjög misjafn en prófið hefur mjög gott forspárgildi um hvort nemendur ljúki skyldu námskeiðum í stærðfræði. Brottfall, svo og hlutfall nemenda sem ekki ná viðunandi árangri í þessum námskeiðum, er áhyggjuefni en undanfarin ár hefur aðeins um þriðjungur nemenda sem skrá sig í námskeiðin lokið þeim (Hrefna Hjartardóttir, 2016).

Umskipti (e. transition) nemenda frá framhaldsskóla í háskóla hafa verið rannsökuð víða og ljóst er að brottfall og slakur árangur í fyrsta árs námskeiðum í stærðfræðigreiningu við háskóla er alþjóðlegt vandamál (Hoyle, Newman og Noss, 2001). Töluvert hefur verið gert til að reyna að auðvelda nýnemum VoN

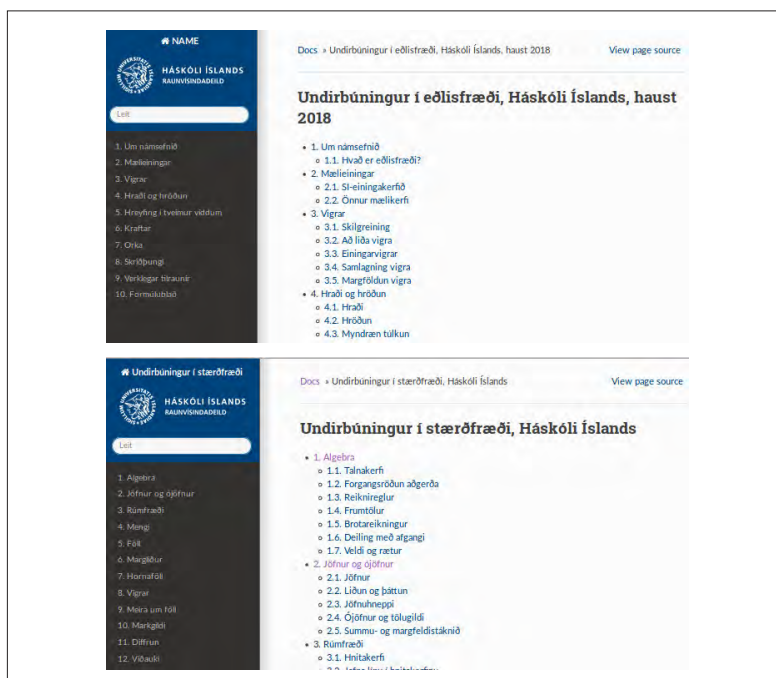
þessi umskipti undanfarin ár. Nemendur hafa verið kynntir fyrir kennslukerfinu Tutor-web sem þróað hefur verið á sviðinu undir handleiðslu Gunnars Stefánssonar prófessors í tölfæði. Tutor-web er opin kennsluvefur (<https://tutor-web.net/>) í stærðfræði og tölfæði og eru þúsundir fjölvalsæfinga aðgengilegar í kerfinu. Algrím sér um að úthluta æfingum til nemenda sem henta getu þeirra hverju sinni og styður kerfið því við einstaklingsmiðað nám. Þegar nemandi hefur svarað spurningu fær hann að sjá hvaða svarmöguleiki var sá rétti ásamt útskýringu á rétta svarinu. Nemandinn fær því endurgjöf (e. feedback) á vinnu sína í rauntíma en rannsóknir hafa sýnt að því fyrr sem nemendur fá endurgjöf á vinnu sína því betur gagnast endurgjöfin þeim (Cole og Todd, 2003). Auk þess að hafa aðgang að Tutor-web hefur nemendum verið boðið upp á stutta upprifjun á framhaldsskólasterðfræði við upphaf náms. Þetta hefur mælst mjög vel fyrir meðal nemenda en yfir 90% þeirra telja að kennslukerfið hafi hjálpað þeim við upphaf náms (samtíðis könnun meðal nýnema) og í rýnihópavíðtölum hafa nemendur lýst því að

kennslukerfið og önnur aðstoð sem þeir fengu hafi skipt sköpum við upphaf náms. Í þessum viðtölum hafa nemendur kallað eftir aðgengi að vönduðu kennsluefni áður en námið hefst ásamt veigameiri upprifjun á grunnhugtökum stærðfræðinnar. Eldri nemandur hafa einnig lýst mikilvægi þess að kynnst samnemendum sínum við upphaf náms og hvernig það að vera hluti af hópi hafi hjálpað þeim í náminu. Þetta rímar við niðurstöður rannsóknar Magnúsar Þórs Torfasonar og Margrétar Sigrúnar Sigurðardóttur (2017) þar sem viðbendingar sáu um að líkur á brotthvarfi minnkuðu hefði nemandi myndað tengsl við samnemendur sína.

Undanfarin tvö ár hafa deildir og námsbrautir getað sótt um svo kallaða B-leið í Kennslu-málasjóð en það eru stærri styrkir en áður fengust úr sjóðnum. Ákveðið var að Raunvísindadeild, sem sér um kennslu í stærðfræði á sviðinu, myndi sækja um styrk í sjóðinn fyrir verkefni sem sneri að bættri móttöku nýnema. Styrkur fékkst til að ráða fimm nemendur á sviðinu í sumarvinnu og voru þau Áshildur Jónsdóttir, Bjarni Hallgrímur Bjarnason, Guðný Halldórsdóttir, Gylfi Þorsteinn Gunnlaugsson og Una Kamilla Steinsen ráðin.

Umgjörðin – undirbúningur nýnemadaga.

Undanfarin ár hefur nýnemum verið boðið upp á háls dags dagskrá þar sem þeir hafa fengið hinar ýmsu kynningar og verið boðnir velkomnir í nám á sviðinu. Að þessu sinni var ákveðið að setja saman dagskrá sem spannaði þrjá daga þar sem boðið yrði upp á ýmiss konar vinnustofur og kynningar ásamt hópefli. Auk þess yrði boðið upp á upprifjunarnám-skeið í stærðfræði í fyrstu kennsluviku. Kynningarfundir fyrir nýnema yrðu einnig haldnir um sumarið og nýnemum boðið upp á að nýta sér kennsluefni á opnum vef til að undirbúa sig fyrir komandi nám.



Mynd 2: Uppbygging námsefnis í stærðfræði og eðlisfræði.

Til að auðvelda upplýsingagjöf var vefsíða útbúin þar sem öllum upplýsingum til nýnema var safnað saman á vefslóðinni: https://www.hi.is/nynemar_verkfraedi_og_natturuvis-indasvlds.

Dagskrá nýnemadaganna var gerð aðgengileg á vefsíðunni en hana má sjá á mynd 1.

Vefsíðunni var breytt nokkrum sinnum yfir sumarið og voru mismunandi atriði dregin fram. Í byrjun júní var póstur sendur á alla umsækjendur um nám á sviðinu, vefsíðan kynnt til sögunnar og þeim boðið á kynningarfund þann 14. júní. Á fundinum var farið yfir þá aðstoð sem nýnemum stóð til boða yfir

sumarið og við upphaf skólaárs. Kynningarfundir voru einnig haldnir 9. og 10. ágúst (nemendur gátu mætt hvorn daginn sem var) þar sem nemendur gátu fengið aðstoð í notkun Tutor-web kerfisins. Þessir kynningarfundir voru vel sóttir og mættu um 200 nemendur í júní og álíka fjöldi í ágúst. Nemendur spurðu margs á þessum fundum og skemmtilegar umræður áttu sér stað.

Námsefnisgerð

Benedikt Steinar Magnússon, lektor í stærðfræði, hefur undanfarin ár þróað kerfi þar sem má með einföldu móti útbúa rafrænt

Móttaka nýnema - dagskrá			
Tími	Miðvikudagur 22. ágúst	Fimmtudagur 23. ágúst	Föstudagur 24. ágúst
09:00 - 12:00	Vinnustofa í stærðfræði Farið yfir grunnatriði í stærðfræði. Námsferni á edbook.hi.is	Kynning á tölvunarfræði Reiknirit - gervigreind - forritun - hugbúnaðarverkfræði	Móttaka nýnema 9:00-10:30 Stöðumat í stærðfræði Matid gildir ekki til einkunnar heldur eingöngu fyrir nemendur til þess að sjá hvar þeir standa 11:00-12:00 Móttaka nýnema í Háskólabíói - stóri salurinn
12:00 - 13:00	Hádegisblé	Hádegisblé	Grill fyrir nýnema
13:00 - 16:00	Vinnustofa í eðlisfræði Farið yfir grunnatriði í eðlisfræði. Námsferni á edbook.hi.is	Kynning frá námsleið Nemendur kynnst sinni námsgrein, kennurum þeirrar námsgreinar og samnemendum	Hópefli með nemendafélögum Nýnemum er boðið í grill eftir móttöku í Háskólabíói og í framhaldinu verður skemmtidagskrá sem nemendafélög sviðsins skipuleggja

Mynd 1: Dagskrá nýnemadaga 22. - 24. ágúst 2018 í Háskóla Íslands



Mynd 3: Vinnustofa í tölvunarfræði.

og gagnvirkir kennslufni sem er aðgengilegt í vefsíðusniði, pdf-skjali og rafbókarsniði. Kerfið kallast Edbook og er aðgengilegt hér: <http://edbook.hi.is/>. Sumarið 2017 var námsefni í framhaldsskólastærðfræði, sem upphaflega var skrifað af Ragnari Sigurðssyni prófessor í stærðfræði, en margir hafa komið að síðan, fært inn í kerfið. Sumarstarfsmennirnir unnu áfram með efnið og má sjá afraksturinn hér: http://edbook.hi.is/undirbuningur_stae/

Sumarstarfsmennirnir létu ekki staðar numið þar heldur útbjuggu þeir einnig upprifunarefni í eðlisfræði í kerfinu sem sjá má hér: http://edbook.hi.is/undirbuningur_edl/

Á mynd 2 má sjá uppbyggingu námsefnisins. Mikil ánægja var með efnið meðal nýnemanna en það nýttist ekki aðeins nemendum VoN heldur getur það nýst öllum nýnemum HÍ sem ætla í nám þar sem nemendur þurfa að kunna góð skil á framhaldsskólastærðfræði eða eðlisfræði.

Vinnustofur

Eins og fram hefur komið á stór hluti nemenda VoN í erfiðleikum með stærðfræði við upphaf náms og sömu sögu er að segja um eðlisfræði og tölvunarfræði. Því var ákveðið að bjóða upp á stuttar vinnustofur í þessum þremur greinum á nýnemadögum. Að auki var ákveðið að hver námsbraut haldi vinnustofu fyrir sína nemendur. Hver vinnustofa yrði tvær til þrjár klukkustundir og því ekki raunhæft að fara yfir mikið efni á þessum tíma. Því var ákveðið að nýta vinnustofurnar í stærðfræði og eðlisfræði fyrst og fremst til að segja nemendum frá því hvernig greinarnar nýtast í hinum ýmsu fögum og í hópefli. Sumarstarfsmennirnir sáu alfarið um að skipu-

leggja og halda vinnustofurnar og fengu þeir aðstoð frá nokkrum samnemendum sínum meðan á þeim stóð.

Þar sem fæstir nýnemar hafa kynnst tölvunarfræði í framhaldsskólum var markmiðið með þeirri vinnustofu að kynna hinar ýmsu hliðar tölvunarfræðinnar fyrir nemendum. Kennarar námsbrautar í tölvunarfræði sáu um þá vinnustofu. Um 400 nýnemar sóttu vinnustofuna í stærðfræði en eitthvað færri hinar vinnustofurnar tvær en eðlisfræði og tölvunarfræði eru ekki hluti af öllum námi á sviðinu.

Algengt er að nemendur sækja undirstöðunámskeið á fyrsta misseri sínu í náminu. Sem dæmi má nefna sækir hinn dæmigerði verkfræðinemi meðal annars námskeið í stærðfræði, eðlisfræði og tölvunarfræði á fyrsta misseri. Til að nemendur gætu hitt sem flesta af kennurum námsbrautarinnar sem þeir ætluðu í nám við í byrjun náms var ákveðið að halda vinnustofur í öllum námsbrautum á nýnemadögum. Þar fengu nemendur smjörþefinn af því sem koma skyldi í náminu, kynntust kennurum námsbrautarinnar og öðrum samnemendum sínum.

Móttaka og hópefli með nemendafélögum

Að morgni lokadags nýnemadaga þreyttu nýnemar stöðumat í stærðfræði en að því loknu var móttaka í Háskólabíói. Rektor, Jón Atli Benediktsson, og sviðsforseti, Sigurður Magnús Garðarsson, buðu nýnema velkomna og kynnti sviðsforseti hina ýmsu starfsemi og þjónustu sviðsins. Jónína Ólafsdóttir Kárdal kynnti starfsemi Náms- og starfsráðgjafar HÍ og formaður Stúdentaráðs, Elísabet Brynjarsdóttir og Númi Sveinsson, Sviðsráði VoN, sögðu frá starfsemi ráðanna. Að lokum

sagði Sylvía Kristín Ólafsdóttir, forstöðumaður hjá Icelandair og fyrrum nemandi sviðsins, nýnemum frá lífinu að loknu námi við sviðið. Að móttökunni lokinni var grillað í blíðskaparveðri og nemendum skipt í hópa eftir nemendafélögum. Við tók dagskrá sem nemendafélögin höfðu skipulagt þar sem nýnemar fóru meðal annars í ratleik með eldri nemendum.

Undirbúningsnámskeið í stærðfræði

Eins og fram kom hér að framan hefur stöðumat í stærðfræði verið lagt fyrir nýnema VoN við upphaf misseris undanfarin ár. Árangur nemenda á prófinu er mjög misjafn og æskilegt væri að geta boðið þeim sem standa höllum fæti upp á aðstoð við upphaf misserisins. Því var ákveðið að halda upprifunarnámskeið á framhaldsskólastærðfræði í fyrstu kennsluviku. Dæmatímar og verkleg kennsla hefst ekki fyrr en í annarri kennsluviku og því eru nemendur sviðsins ekki í tímum eftir hádegi fyrstu vikuna. Nemendur þreyttu stöðumatid föstudaginn 24. ágúst og gátu þeir séð árangur sinn í Uglu næsta dag. Nemendur, sem ekki náðu góðum árangri í stöðumatinu, voru sérstaklega hvattir til að nýta sér upprifunarnámskeiðið og voru þátttakendur um 150 talsins. Sumarstarfsmennirnir sáu alfarið um námskeiðið með aðstoð nokkurra samnemenda sinna og var mikil áhersla lögð á virka þátttöku nýnemanna. Það var gert með aðstoð Socratic-forritsins (<http://socratic.com>) sem notað hefur verið með mjög góðum árangri í nokkrum námskeiðum á sviðinu. Með forritinu getur kennari beðið nemendur að leysa ákveðin verkefni og fylgst með hvernig



Mynd 4: Grillveisla á nýnemadögum.

gengur í rauntíma. Kennari getur þá séð hvaða efni nemendur hafa náð tökum á og hvaða efni þarf að fara betur í. Við val á efnistökum upprifjunarnámskeiðsins var stuðst við niðurstöður stöðumatsins undanfarin ár og var megináhersla lögð á algebru og fallahugtakið ásamt nokkrum öðrum lykilhugtökum.

Hvernig tókst til og hvernig nýttist verkefnið áfram?

Það var fljótt ljóst að sumarstarfsmennirnir bjuggu yfir mörgum góðum hugmyndum og

voru mun betur til þess fallnir að skipuleggja dagskrá fyrir nýnema en kennarar sviðsins. Þeir stóðu sig frábærlega allt sumarið í undirbúningsvinnunni og var sérstaklega gaman að fylgjast með framkvæmdinni hjá þeim á sjálfum nýnemadögum. Auk þess að skipuleggja nýnemadagana og vinna í kennslufni tóku þeir saman ýmiss konar fróðleik fyrir nýnema og útbjuggu glæsilegt kynningarmyndband um byggingar skólans. Það vildi svo heppilega til að einn sumarstarfsmaðurinn, Bjarni Hallgrímur, er sérfræðingur í myndbandagerð og sá hann um gerð myndbandsins sem sjá

má hér: https://www.youtube.com/watch?t=ime_continue=1&v=3otiN36o8r4 og á vefsíðu nýnemadaganna.

Á stöðumatinu í stærðfræði voru nemendur spurðir um upplifun sína af nýnemadögum. Um 80% nýnema sem tóku þátt í nýnemadögum sögðust hafa haft gagn og/eða gaman af vinnustofunum í stærðfræði, eðlisfræði og tölvunarfræði og 99% nýnema sögðust hafa haft gagn og/eða gaman af námsbrautarvinnustofunum. Auk spurninganna í stöðumatinu var spurningalisti sendur til nýnema þar sem þeim gafst kostur á að svara öllum spurningum um upplifun sína af nýnemadögum. Sem dæmi um athugasemdir sem komu fram eru að gott hafi verið að kynna samnemendum sínum og kennurum við upphaf náms, vinnustofurnar hafi komið þeim í girinn og nýnemadagarnir hafi losað um stressið sem fylgir því að byrja í nýju námi. Það kom einhverjum á óvart að í vinnustofunum hafi verið meira lagt upp úr hópefli en kennslu, einhverjum fannst yfirferðin of hröð en öðrum of hæg.

Eftir sumarið liggur eftir mikið af kennslufni, kynningarefni og reynsla sem mun nýtast áfram við móttöku nýnema. Ákveðið hefur verið að búa til námskeið í edX Edge sem kennarar HÍ hafa nú aðgang að eftir að skólinn gerðist aðili að edX í nóvember 2017. Þannig mætti hugsa sér að þegar nýnemi er samþykktur inn í nám á sviðinu sé hann skráður í námskeiðið og hafi þannig aðgang að námsefni í stærðfræði og eðlisfræði auk ýmiss konar kynningarefnis sem mun vonandi auðvelda nýnemum að hefja nám við Verkfræði- og náttúruvísindasvið um komandi ár.

Samstarf

Heimsókn frá Háskólanum í Tromsø

Ásta Bryndís Schram, lektor og kennsluþróunarstjóri á Heilbrigðisvísindasviði og kennsluráðgjafi við Kennslumiðstöð Háskóla Íslands

Starfsfólk Kennslumiðstöðvar Háskóla Íslands á góða samstarfsfélagi við Háskólann í Tromsø í Noregi. Þessi kynni mynduðust í gegnum samstarfsnetið Nordic-Baltic Network. Þær Anita Iversen, Sírí Skommessvik, Rigmor Furu og Nanna Hauksdóttir, allar starfandi á Kennslumiðstöð Heilbrigðisvísindasviðs Háskólans í Tromsø (n. Senter for helsefaglig pedagogisk utvikling), sóttu okkur heim og kynntu sér meðal annars starfsemi Kennslumiðstöðvarinnar. Kennsluþróun er þeirra ær og kár, ekki síst efling á þverfræðilegu samstarfi og þverfræðilegu námi á Heilbrigðisvísindasviði. Nanna Hauksdóttir er forkölfur að myndun norræns nets um þverfræðilegt nám og samstarf – NIPNET – og við hlökkum til frekara samstarfs.



Ásta Bryndís Schram er hér í góðum hópi Tromsø kvenna. Ljósmynd: Elva Björg Einarssdóttir.

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5.6 An example of a course schedule

Kennsluáætlun STÆ209G

Kennarar

Anna Helga Jónsdóttir (ahj@hi.is), skrifstofa 2. hæð í Tæknigarði, herbergi 221, mun sjá um fyrirlestratíma, hluta æfingatíma og hafa umsjón með námskeiðinu.

Hannes Kristinn Árnason (hka9@hi.is) og Gylfi Þorsteinn Gunnlaugsson (gthg28@hi.is) munu sjá um æfingatíma.

Bergdís Arnardóttir (bea32@hi.is) og Ágúst Páll Haraldsson (aph5@hi.is) munu sjá um vinnustofur.

Meginviðfangsefni

Í byrjun námskeiðsins eru grunnhugtök tölfræðinnar kynnt til sögunnar, svo sem þýði, úrtak og breyta. Nemendur kynnst hinum ýmsu lýsistærðum og myndrænni framsetningu gagna. Því næst verður farið í grundvallaratriði líkindafræðinnar og helstu líkindadreifingar kynntar.

Seinni hluti námskeiðsins snýr að ályktunartölfræði þar sem skoðuð verða tilgátupróf og öryggisbil fyrir meðaltöl, dreifni og hlutföll og farið verður í fervikagreiningu og aðhvarfsgreiningu. Nemendur læra beitingu allra ofangreindra aðferða í tölfræðihugbúnaðinum R.

Kennslubækur

Tölfræði frá Grunni, **6. prentun**, skrifuð af Önnu Helgu Jónsdóttur og Sigrúnu Helgu Lund verður notuð í námskeiðinu. Bókin er í opnum aðgangi hér: [Tölfræði frá grunni](#) en bókin verður einnig gerð aðgengileg á .pdf formi á Moodle síðu námskeiðsins. Fyrir þá sem vilja heldur "alvöru" bók má kaupa hana í Háskólafréttun, Fálkagötu 2, á prentkostnaði sem er 3450 kr.

R frá grunni, **1. prentun**, skrifuð að Sigrúnu Helgu Lund, Önnu Helgu Jónsdóttir og Bjarka Þór Elvarssyni. Bókin er í opnum aðgangi hér: [R frá grunni](#) en hún verður einnig gerð aðgengileg á .pdf formi á Moodle síðu námskeiðsins. Fyrir þá sem vilja heldur "alvöru" bók má kaupa hana í Háskólafréttun, Fálkagötu 2, á prentkostnaði sem er 2450 kr.

Hæfniviðmið

Að loknu námskeiðinu á nemandi að:

- geta gert grein fyrir grunnhugtökum tölfræðinnar, svo sem þýði, úrtak, breyta og slembni ásamt því að geta lagt mat á tilraunahögun tölfræðilegra tilrauna hvað varðar úrtakshögun, blindni og endurtekningar.

- geta reiknað helstu lýsistærðir sem lýsa miðju og dreifð gagna og geta lagt mat á hvaða lýsistærðir er viðeigandi að nota hverju sinni.
- þekkja helstu gröf sem notuð eru til að lýsa gögnum myndrænt ásamt því að þekkja hvaða gröf eru viðeigandi að nota hverju sinni.
- geta gert grein fyrir grunhugtökum líkindafræðinnar, svo sem atburður, mengi, sam-mengi og sniðmengi og þekkja helstu líkindadreifingar, geta lagt mat á hvenær er viðeigandi að nota hvaða líkindadreifingu og geta reiknað líkur á atburðum með að nota dreifingar-nar.
- skilja hugmyndafræðina á bakvið ályktunartölfræði og geti í ljósi þess framkvæmt tilgá-tupróf og smíðað öryggisbil fyrir meðaltöl, dreifni og hlutföll þýðis.
- skilja hugmyndafræðina á bakvið fervikagreiningu og einfalt línulegt aðhvarf og getað beitt þeim aðferðum skammlaust.
- getað beitt ofangreindum aðferðum í tölfræðihugbúnaðnum R og skilað af sér skýrslu þar sem niðurstöðum greiningarinnar er lýst.
- geti lagt mat á hvenær er við hæfi að beita ólíkum aðferðum og í ljósi þess lesið einfaldan tölfræðitexta með gagnrýnum augum.

Kennsluhættir

Fyrirlestrar tímar

Námskeiðið verður kennt á svo kölluðu vendikennsluformi sem þýðir að ekki verða haldnir fyrirlestrar heldur vinnum við saman með efnið í kennslustundunum. Þið þurfið því að koma undirbúin í kennslustundirnar en það gerið þið með að horfa á myndbönd sem verða gerð aðgengileg á Moodle síðu námskeiðsins (þið komist inn á Moodle síðu námskeiðsins í gegnum Uglu) eða með að lesa bókina (jafnvel bæði!).

Fyrirlestartímar verða á miðvikudögum frá 11:40 til 13:10 í stofu 105 á Háskólatorgi. Mælt er með að nemendur mæti með fartölvur í þá tíma.

Æfingartímar

Í æfingatímum munið þið æfa ykkur í R. Í upphafi æfingatíma verður yfirleitt umfjöllun um efnisatriði vikunnar í R. Æfingatímaæfingar munu yfirleitt liggja fyrir sem þið vinnið svo í tímanum og skilið í lok tímans (eða í síðasta lagi á mánudeginum eftir tímann). Nemendur sem vinna verkefnin fá æfingatímapirok sem gilda til hækkunar í lokaeinkunn.

Æfingartímar verða á föstudögum frá 10:00 - 12:20 í stofu HT-105. **Nemendur eiga að mæta með fartölvu í þá tíma nema annað sé tekið fram í þeirri viku.** Þeir nemendur sem ekki geta mætt með fartölvu eru beðnir um að hafa samband við mig sem fyrst.

Vinnustofur

Vinnustofur verða á mánudögum klukkan 15:50 - 17:20 í stofu 301 í Árnagarði. Það er frjáls mæting í vinnustofurnar og má líta á þær sem opið hús þar sem nemendur geta fengið aðstoð við fyrirbyggjandi verkefni.

Ég hvet ykkur eindregið til að nýta þessa þjónustu þar sem þið eigið möguleika að fá einstaklingsmiðaða kennslu frá eldri nemendum.

Hugbúnaður

Námsumsjónarkerfið Moodle verður notað í námskeiðinu <https://moodle.hi.is/>.

Umræðukerfið Piazza <http://piazza.com/> verður notað fyrir umræður og spurningar.

Kennt verður á tölfraðihugbúnaðinn R. Hann er ókeypis og má setja upp á Linux, Mac og Windows tölvum. R má nálgast á síðunni <https://cran.hafro.is/>.

Ritillin RStudio verður notaður til að vinna með R. Hægt er að nálgast RStudio á síðunni <https://www.rstudio.com/products/rstudio/download/>

Notast verður við kennsluvefinn tutor-web <http://tutor-web.net> og þurfa nemendur að skila verkefnum í tutor-web.

Notast verður við Socrative umhverfið <http://socrative.com/>.

Námsmat

- Skriflegt þriggja klukkustunda próf 50%. Leyfilegt er að hafa reiknivél í prófinu og því fylgir ítarlegt formúlublað. Á prófinu veðra krossar og skrifleg dæmi.
- Æfingatímaæfingar 5%, 6 æfingatímaprik gefa fullt hús (til hækkunar)
- Skilaverkefni 10%, 6 af hæstu af 7 gilda
- Stöðumat 15%, hærra af tveimur gildir
- Fyrri R-verkefni 10%
- Seinna R-verkefni 10 %

Vetrareinkunn verður reiknuð út frá æfingatímaæfingum (aðeins til hækkunar), skilaverkefnum, stöðumati (hærra af tveimur gildir) og R verkefnunum og gildir hún 50% af lokaеinkunn. Nemendur þurfa að ná lágmarkseinkunn (5) í vetrareinkunn og á lokaprófi til að standast námskeiðið.

Skilaverkefnum á að hlaða upp á Moodle eða ljúka við á tutor-web (eftir því sem við á) fyrir klukkan 23:59 á auglýstum skiladegi. Ekki verður tekið við verkefnum sem skilað er of seint nema um óviðráðanlegar aðstæður sé að ræða.

Próftökuréttur

Til að öðlast próftökurétt þurfa nemendur að hafa

- skilað 6 af 7 skilaverkefnum
- tekið a.m.k. annað af tveimur stöðumötum
- skilað báðum R-verkefnunum

Hafi nemendur próftökurétt frá því í fyrra þurfa þeir ekki að skila skilaverkefnunum né R-verkefnum en þurfa að mæta í a.m.k. annað stöðumatið. **Nemendur sem telja sig hafa próftökurétt eru beðnir að hafa samband við mig sem fyrst.**

Sérúrræði

Eiga nemendur rétt á sérúrræði í prófum þarf að skila inn vottorði því til staðfestingar frá Námsráðgjöf áður en próf hefst. Á þetta jafnt við stöðumöt sem og skriflegt lokapróf. **Nemendur með sérúrræði eru beðnir um að hafa samband við mig sem fyrst.**

Vinnuframlag

Námskeiðið telur 8 ECTS einingar. Að baki hverri einingu eiga að liggja 25-30 klukkustunda vinna nemanda með öllu meðtöldu; tímasókn, heimavinna, hópvinna, verkefni og próf. Vinnustundir í þessu námskeiði eiga því að vera 200-240 talsins. Við munum eyða um 60 klukkustundum saman í kennslustundum sem þýðir að eftir standa fjórar heilar vinnuvikur sem nýta á í þetta námskeið.

Fyrirspurnir

Ég hvet ykkur til að nota umræðukerfið Piazza fyrir hverjar þær spurningar sem kunna að vakna. Samtímis bið ég ykkur um að senda tölvupósta **eingöngu þegar um persónuleg málefni er að ræða**. Þyki ykkur eitthvað vera óljóst er nokkuð víst að einhver annar af um 120 nemendum námskeiðsins sé á sömu skoðun og þá kemur umræðukerfið að betri notum. **Tölvupóstar sem innihalda spurningar sem við koma skipulagi eða námsefni námskeiðsins verður ekki svarað heldur settir inn á Piazza og svarað þar.** Auðvelt er að stilla hversu oft Piazza sendir tölvupósta í netföng notenda.

Ábendingar - sjálboðaliðar óskast!

Ég vil endilega heyra frá ykkur hvað ykkur finnst að betur mætti fara og hvað ykkur finnst gott við námskeiðið. Ég mun leita eftir sjálboðaliðum frá öllum námsleinum og hitta þau á misserinu til að ræða hvernig gengur. Endilega komið ábendingum ykkar áleiðis í gegnum þau eða beint til mín.