



Final Report

Kennslumálasjóður 2024 (Leið B)

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Project Aim

Stelpur Forrita is an initiative aimed at addressing the high dropout rates in the Computer Science (CS) and Software Engineering (SE) programs at the University of Iceland (HÍ). Inspired by the Stelpur Diffra math workshops organized by Nanna Kristjánsdóttir, it especially focuses on female and gender-queer students, who are underrepresented within these programs and therefore have a smaller support network at their disposal than male students. The initiative's primary objective is to foster interpersonal connections, build resilience, provide academic orientation and promote inclusivity within the tech industry from the start of students' journey. By combining theoretical education with practical experiences and social engagements, Stelpur Forrita aims to equip participants with the skills, confidence, and social network necessary to find and navigate their paths in the CS/SE programs successfully.

Project Description

Workshop Content

In a week-long workshop on 12-16 August 2024, participants were immersed in a dynamic environment designed to spark curiosity, provide insights, and showcase applications in CS/SE beyond the high-school level. The workshop comprised theoretical sessions covering essential concepts in CS/SE, complemented by hands-on training sessions where participants learned to use technical tools like Git for version control and solve problems using common programming languages such as Java and Python. Additionally, participants were introduced to application areas such as artificial intelligence, cybersecurity, and language technology.

In addition to providing this preview of academic concepts to be covered in depth in later semesters, Stelpur Forrita aimed to provide a realistic preview of participants' future learning and working environment, as well as their professional responsibilities. The workshop therefore included company visits and discussions on social issues related to IT, which empower participants to make better-informed decisions on potential career paths and motivate the theoretical aspects of the CS/SE program by placing them into a practical context.

Day 1: Introduction to Collaborative Software Development

The workshop began with an opening session going over the goals, schedule, and structure of the five-day program, as well as a short introduction to the organizers and university environment at the CS department at HÍ. Sigyn Jónsdóttir, co-founder of the diversity, equity, and inclusion (DEI) software provider Alda, spoke about her career journey and her role as a Chief Technology Officer (CTO) in a software company, and led ice-breaking exercises for the participants. Magnús Daníel Budai Einarsson also introduced Nörd (The Association of CS/SE Students at HÍ) as a way for the students to get support and form social networks with their peers. After the lunch break, the focus moved to the software development process as a collaborative endeavor, where participants were introduced to tools like GitHub, essential for version control in team environments. This session was followed with a simple exercise of pushing code to a repository, with representatives of Ada (The Association of Women and Non-Binary People in IT at HÍ) and Nörd providing hands-on support.

Day 2: E-Commerce and Web Development

On the second day, the participants explored the field of e-commerce and web development. Valentina Griffin, co-founder of WomenTechIceland and owner of Xocoatl.is introduced the participants to lean project management and no-code web design for e-commerce, and led a discussion on the intricacies of starting a business in Iceland. The session provided practical insights into project management and the process of turning digital ideas into reality. Through practical exercises, participants learned to create and manage online platforms. The day also included an optional company visit to IT solutions provider Tegra, offering real-world exposure to behind-the-scenes Business Central technology that powers e-commerce sites in Iceland.

Day 3: Cybersecurity

The third day was dedicated to cybersecurity, a critical area in the tech industry. Jacky Mallett, cybersecurity professor at Reykjavik University, introduced a concise history of cybersecurity and the role women had in its early development, led a hands-on practice of using the command-line interface and secure shell connections, discussed human factors of vulnerabilities in cyberspace, and provided practical advice on staying safe online. Interactive sessions allowed participants to apply these concepts in practical scenarios, enhancing their understanding of how to protect systems and data from potential attacks.

Day 4: Artificial Intelligence and Language Technology

Artificial Intelligence (AI) and Natural Language Processing (NLP) were the focus on the fourth day. Steinunn Rut Fríðriksdóttir, PhD student at the University of Iceland, delivered sessions on AI fundamentals and ethics, and introduced the Python programming language in the context of Large Language Models (LLMs). Participants were introduced to how AI is used to process and understand human language, a cutting-edge area in CS. The day also offered insights into academic research, with discussions on life in academia and the role of AI in language technology. An optional visit to the Árni Magnússon Institute for Icelandic Studies provided a practical context for these discussions.

Day 5: Career Paths and Entrepreneurship

The final day centered on exploring career opportunities and entrepreneurship in the tech industry. Safa Jemai, founder of Víkonnekt and winner of the entrepreneurial competition Gulleggið 2022 shared her

experience following her graduation from the SE program at HÍ and being an entrepreneur of foreign origin. In addition, Jenna Björk Guðmundsdóttir and Kolfinna Kristínardóttir from Klak Icelandic Startups gave an overview of the support Klak offers to people with business ideas looking to be entrepreneurs in Iceland. Participants engaged in discussions about hackathons, startup competitions, and employment pathways post-graduation. The day was designed to provide participants with a realistic view of the tech industry and inspire them to consider various career options. The workshop concluded with a lunch presentation at the CCP headquarters in Gróska and an optional company visit to Reiknistofa bankanna (RB), as well as a closing session where participants reflected on their learning experiences and celebrated the connections they made throughout the week.

The Stelpur Forrita workshop was designed not only to educate participants on the theoretical aspects of CS/SE but also to provide them with practical skills and industry exposure. Through a combination of expert-led sessions, hands-on activities, and company visits, the workshop offered a comprehensive introduction to the field, helping participants make informed decisions about their future careers in tech.

Workshop Structure

The Stelpur Forrita workshop was run on 12-16 August 2024. Day 1 involved a full day on campus at 09:00-16:00. Days 2-4 had on-campus activities at 09:00-14:30 with optional company visits at 15:00-17:30, and Day 5 had on-campus activities at 09:00-13:30 with a company visit and closing ceremony at 14:00-16:30. The on-campus activities on Days 1-4 took place in Setberg, the HÍ house of education, while the Day 5 on-campus activities took place in Gróska, the house of innovation in the HÍ science park.

The program was advertised as open to women and genderqueer individuals over the age of 18 in Iceland who want to learn more about IT, are curious about university life as a CS/SE student, and excited to meet like-minded people. To secure participants' registration and ensure their commitment, the participants paid a deposit of 3.000 ISK, which was refunded upon their participation in the workshop.

A total of 17 participants registered by August 6. Two deregistered due to schedule conflicts, and three were no-shows. The workshop saw an average participation of nine to 11 individuals each day. About half of all participants could only attend partially due to childcare, work, or travel plans. Partial attendance was a point of concern for several potential participants, and some decided not to register at all because they could not attend fully.

We observed large diversity in the participants. The majority of the participants were of foreign origin, with 41% only comfortable with English as a language of instruction. With ages ranging from 18-43, 70% of the participants are registered at the university, and 30% of those are registered for CS/SE degrees. The participants exhibited varying levels of familiarity with programming concepts, with 58% deciding to register for the workshop to gain a basic understanding of coding/programming as they deemed it overwhelming or intimidating. 30% of registered participants wanted to participate to expand their social network.

Organizer Responsibilities

Theresia Mita Erika and Saeeda Shafae, the two Computer Science BSc students serving as organizers of Stelpur Forrita, were responsible for the following tasks:

- Grant applications and sponsorships: Securing funding, meeting with potential sponsors, and negotiating support for the program.
- Event promotion: Advertising the event through various channels, building an online presence via the website *stelpurforrita.club* and social media accounts (Instagram and LinkedIn), and engaging with participants through social media and direct outreach.
- Instructor recruitment and coordination: Selecting and recruiting suitable instructors, collaborating with them to design a comprehensive course plan tailored to the program's objectives.
- Content creation: Developing a logo, participant handbook and other promotional/educational materials, ensuring that the content was accessible and inclusive.
- Logistics and venue coordination: Acquiring classrooms and other necessary facilities, organizing tools and materials (e.g., name tags, merchandise, certificate of attendance for the participants, certificate of appreciation for the instructors), arranging transportation and managing expectations for activities such as the company visits.
- Participant communication: Managing inquiries from participants, ensuring a safe and anonymous way for the participants to ask questions, voice their concerns, provide feedback on the workshop, activities, and company visits, as well as ensuring smooth registration and attendance.
- Inclusivity and program design: Consult relevant experts to learn and implement best practices for inclusivity to create a safe, welcoming, and supportive environment for all participants.
- Event execution: Ensuring that the participants have all the information to find the location and have enough preparation to get started, overseeing and assisting the learning process for participants, communicating the need for additional explanation for the teachers, coordinating food orders, ensuring that everyone has access to the conference network, and responding effectively to any additional need for extra resources.
- Media and outreach: Conducting interviews for articles, collaborating with teachers and university staff, and representing the program to external audiences.

Matthias Book, professor in software engineering and head of the Computer Science Department in 2024, provided academic guidance and administrative support to the organizing students.

Project Finances

The grant of 3.200.000 ISK from the **HÍ Academic Affairs Fund** was used to compensate the organizing students for their time and effort in preparing and running the workshop. Both students worked on the project part-time at 50% capacity for six months, i.e. a total project effort of 2 people * 6 months * 50% = 6 person-months, splitting the responsibilities for the tasks listed in the previous section.

Verkfræðingafélag Íslands (VFÍ), the Association of Chartered Engineers in Iceland, provided 250.000 ISK that were used to compensate the external instructors for preparing and speaking at the workshop. The basis for their compensation was the hourly rate for part-time teachers (stundakennarar) with a PhD degree at HÍ.

Arion banki sponsored refreshments, i.e. lunch for Days 1-4 and breakfast on Day 4. The mealtimes provided further opportunities for exchange of ideas and discussions between participants and instructors. The sponsored meal expenses totaled 207.815 ISK. Lunch on Day 5 was provided by CCP as part of their lunch presentation in Gróska.

Tegra sponsored the production of 20 notebooks for participants and instructors totaling 75.500 ISK, as well as transportation between the HÍ campus and Tegra office totaling about 14.000 ISK. Tegra also sponsored Magnús Daníel Budai Einarsson to speak on Day 1 of the workshop.

The **organizers** paid expenses such as social media marketing, transportation to RB and name tags out of pocket.

The **School of Engineering and Natural Sciences (SENS)** provided the on-campus facilities such as rooms, wireless Internet access, and the faculty advisor's time as in-kind contributions.

Participant Feedback

The Stelpur Forrita workshop was highly successful in achieving its objectives of increasing interest in information technology, computer science, and software engineering among women and non-binary participants. From a total of six end-of-workshop survey participants (out of 12 total attending participants, i.e. 50% response rate), the feedback highlights several key areas of impact:

Interest in Computer Science and Workshop Content: All participants rated themselves as either "Extremely interested" or showed a significant increase in interest in computer science after attending the workshop. Cybersecurity was the most popular topic, with several participants specifically highlighting Jacky Mallet's session as particularly impactful or even "life-changing." Participants appreciated the broad range of topics covered, such as Git, Python, E-Commerce, AI, and entrepreneurship, which helped them understand their interests better and gain practical skills.

Effectiveness of Instructors: All participants rated the instructors as "Extremely helpful." The feedback emphasized that instructors were clear in their explanations, welcoming, and took care to make the learning environment inclusive and comfortable. Many participants noted the supportive and inclusive environment created by the instructors, with comments such as "the instructors used clear language and explained industry-specific terms, ensuring complex concepts were accessible to everyone." Jacky Mallet's cybersecurity session received multiple mentions as a highlight and life-changing experience, particularly praised for being both informative and accessible.

Sense of Belonging: Participants consistently rated the environment as extremely welcoming and comfortable, indicating that the efforts to create a safe and inclusive space were successful. One participant

noted the importance of enforcing the "safer space" concept, suggesting more strictness about the presence of cis-males, while acknowledging that the overall atmosphere was mindful and understanding.

Organization and Communication: Participants praised the organization and communication throughout the program. One participant mentioned that the organizers "never let any difficult situation create a stressful atmosphere," which contributed to their feeling relaxed and comfortable. Feedback about logistics, such as workshop preparation and communication before and during the event, was overwhelmingly positive, with phrases like "very welcoming and inviting space" and "the communication was very good and clear."

Suggestions for Improvement from the Participants: Several participants expressed the need for more precise instructions during technical tasks, especially in coding or setting up tools. Suggestions included clearer commands like "press/copy/type this" and grouping participants by operating system (e.g., Mac/Windows) for easier tool setup. One participant suggested improving the seating arrangement to accommodate better interaction, favoring the horseshoe configuration instead of the groups of three used throughout Day 1-3.

Post-Workshop Intentions: Participants indicated a desire to apply what they learned in real life, whether in personal projects (e.g., launching an e-commerce website), improving technical skills (e.g., cybersecurity, using Git, coding in Python), or exploring further education in CS/SE.

Project Retrospective and Outlook

Opportunities for Improvement

Based on their experience and participants' feedback, the workshop organizers see the following opportunities for improvement in future editions of Stelpur Forrita:

Instructor coordination: The organizers had expected a higher level of collaboration between the instructors in order to moderate the pace, scope, and difficulty level of the materials presented each day of the workshop. Unfortunately, the shared repository arranged by the organizers was underutilized in this edition of Stelpur Forrita resulting in little to no coordination between the instructors. Any modification requested by the organizers was however handled swiftly by the instructors with short notice. Organizers of future editions of Stelpur Forrita should encourage the instructors to start sharing the material they are working on earlier in the process while making sure not to micromanage the instructors who are experts in their field.

Registration fee: Administrative work related to managing the registration fee of 3.000 ISK required the cooperation of two employees in the SENS finance division. The financial system at the university relies on the participants to correctly set up their payment transaction with the account number associated with Stelpur Forrita, which cannot be guaranteed and has proven to cause complications. Feedback from the

administration indicated that the effort of tallying the registration fees and refunding them to eligible participants outweighs the benefit of decreasing the likelihood of no-shows from registered applicants. Future editions of Stelpur Forrita should evaluate the consequences of having no registration fees to decrease the administrative overhead and further reduce financial obstacles for prospective participants.

Topic Diversity: The inclusion of various IT fields was beneficial in catering to different interests. Future workshops should continue this approach while possibly expanding on emerging topics like AI and cybersecurity. Including practical skills and missing information in the program may be a crucial step in connecting participants and instructors. In this iteration of Stelpur Forrita, for example, Jacky Mallet delivered a highly appreciated finance lecture in addition to her cybersecurity lecture.

Enhance Practical Sessions: Some participants suggested more detailed guidance during hands-on sessions. Implementing more structured, step-by-step instructions could improve the learning experience for those less familiar with technical tools, as well as making sure that all participants are on the same page before moving on to the next step. As some participants have stated, they needed clear instructions on where to click and what to copy etc. Collaborative work in a group project was especially challenging when the participants did not yet have a solid grasp of the material at hand. For future editions of the workshop, participants may benefit from more thorough individual assistance, with the involvement of volunteer teaching assistants. Collaborative work can instead be focused on group discussions reflecting on the applications and implications of the topic explored on that day.

Scheduling: Several participants reached out with scheduling conflicts, primarily due to childcare, work, or other commitments. To improve accessibility, future workshops could offer more flexible scheduling options, such as evening/weekend sessions, to reach as many interested people as possible. Explicitly announcing that partial attendance is allowed may increase attendance of people who can gain the benefits of networking with professionals in the fields they are interested in.

The end-of-workshop survey showed a significant increase in our participants' interest in exploring CS/SE topics further, which aligns with the university's goal of recruiting prospective students to the Computer Science Department's programs. This first edition of Stelpur Forrita was advertised from the University Day on 2 March 2024, but was conducted on 12 August 2024, after the deadline was closed for the registration for the bachelor's program. Future editions of the workshop may benefit the university if the workshop ends before the workshop participants need to make a decision to further their education at the University of Iceland. Shifting focus to recruit new students instead of nourishing social connections for upcoming first year students may require a different marketing approach and organization of workshop content. Moving the workshop timing earlier may also pose a difficulty for prospective participants to take the time off to attend.

A plausible solution to ensuring that the participants gain understanding of the workshop material without having to commit a significant time off their day-to-day lives to attend the workshop is to modify the

organization of the program. Instead of an intensive workshop for five consecutive days, some busy participants may benefit from a once-a-week commitment. While having the promise of a deeper, more hands-on exploration of the material at hand, this arrangement has the downside of limited peer interaction and connection as different groups of people may attend at a time. The networking opportunities with the companies may also be limited to the participants' interaction with the instructors, because the company visits may be more difficult to fit in the schedule. Further consideration is needed to determine whether a full day on a Saturday (when buildings are open at the university campus) would be more effective than a few hours on one of the weekdays. Having shorter sessions spanning a few weeks will require additional organizational work to design the workshop material to fit the given timeline, as well as to coordinate with the instructors on when they can present.

Marketing and visibility: Expanding the visibility of Stelpur Forrita will be key to attracting more participants and potential sponsors. Increasing the program's presence on social media, as well as developing partnerships with local schools and community organizations, can help reach a broader demographic. Additionally, outreach to underrepresented groups within the IT community could be strengthened by showcasing pictures and reviews from past participants.

Deposits and refunds: The participants were requested to pay a deposit for their registration to reduce the number of no-shows. The refund process, however, took considerable effort for the SENS finance division due to issues related to categorization of the funds that rely on sender's comments associated with the money transfer. It would be interesting to see how the rate of attendance changes without this deposit payment.

Survey: To increase the response rate for a more comprehensive understanding of the participants' experience, it might be beneficial to dedicate some time for the end-of-workshop survey as part of the closing session.

Future Sources of Funding

University grants and in-kind contributions: The University of Iceland has played a crucial role in supporting this initial edition of Stelpur Forrita through a grant from the Academic Affairs Fund (kennslumálasjóður), which covered the salary for the two project organizers as the biggest cost factor, and the School of Engineering and Natural Sciences' in-kind contributions. However, it may not be possible to rely on this level of funding in future editions. To sustain and expand the Stelpur Forrita program, it will be essential to diversify funding sources and explore additional grant opportunities.

Corporate sponsorship: Developing long-term partnerships with industry players will be key to ensuring Stelpur Forrita remains sustainable. By fostering enduring collaborations with tech companies, banks, and organizations committed to diversity in tech, we can create a stable network of sponsors who are invested in the program's mission. In future iterations, we plan to increase outreach to companies, offering them

opportunities to sponsor elements such as lecturers, participant materials, meals, or merchandise in exchange for visibility (e.g., featuring company logos on participant notebooks, t-shirts, and tote bags). This mutually beneficial relationship could significantly reduce operational costs while strengthening ties between industry and education. Multiple companies also offer one paid day off per year per employee for volunteering purposes which resulted in greater interest in supporting the workshop with instructors/representatives of the company instead of cash grants. Utilizing this scheme may reduce the amount of grants we need to pay instructors in future iterations of the workshop.

Crowdfunding: There is strong interest from individuals who recognize the importance of empowering girls and non-binary students in tech, even if their employers do not offer formal sponsorship. Crowdfunding could be an effective way to tap into this support, allowing for small but meaningful contributions from the broader community. Setting up a transparent, dedicated platform for this would enable people to contribute directly to the program and improve the overall experience for both participants and instructors.

Grants: While applying for grants can be time-consuming and success rates are often low, this year's success has already opened new opportunities for future funding. For example, the program could target upcoming grant initiatives, such as FrumkvöðlaAuður offered by Kvika Bank in May, which focuses on women's initiatives. Skapa.is keeps track of grants being offered for social innovation programs such as Stelpur Forrita, which can be another source of funding for the workshop. Understanding the return on time invested in applying for such grants in comparison to approaching companies for cash grants will provide insight into how the organizers' time can be used.