University of British Columbia

 Proposal for Improving the Recruitment of Volunteers at Visual Cognition Lab

ENGL 301 Formal Report Draft

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16 Mar. 2022

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# **Introduction**

The Visual Cognition Lab is a vision science lab in the Psychology Department of the University of British Columbia operated by Dr. Ronald A. Rensink as the principal investigator. Our lab is interested in investigating visual intelligence, how the human visual system uses the light entering the eyes to create a variety of perceptual experiences.  The researchers are interested in exploring the mechanisms that carry this out and the ways this knowledge can help with the design of effective visual displays.

The lab has multiple projects are that owned by different groups of people with most projects using software programs to conduct experiments. Therefore, researchers must have a basic understanding of programming to effectively develop new experiments and modify the existing ones. Once the experiment is made, participants are collected to conduct the experiment on the computer located inside an isolated room. The experiment usually consists of participants choosing one of two similar but different pictures in sequence. After the participants have successfully completed the experiment, the experiment is saved on an online database where researchers retrieve the data to analyze the result.

Although most lab researchers have a good understanding of the experiment objective, design, specification, and basic programming knowledge, they often lack both the knowledge and experience to code complicated experiments. Also, the researcher’s main attention and time are dedicated to reading research papers, discussing with other researchers, and coming up with a novel research proposal for the next experiment. Previously there were programmers in the lab who specifically worked on coding the experiments for researchers but many of the members left after graduation. This resulted in the coding team being short-staffed with multiple experiments left to be coded. As a solution to this problem, new programmers need to be recruited with a systematic hiring process and interviewing. To make this happen there must be a recruitment process to find interested applicants. Then the applicants must be selected based on behavioral and technical skills by conducting interviews. If the applicant has successfully passed the interview, the applicant is officially part of the coding team.

The primary data for the qualification of new programmers and the current needs in the coding team was gathered by surveying programming in the team. Also, supporting secondary data was collected through interviews with lab managers and programmers. Overall, programmers agreed that there is a strong need for new recruitments and preferred the programmers to have a basic knowledge of programming skills. Based on the analysis of the result it is clearly evident that there is an urgent need to recruit new programmers and the effective methods of recruiting new members. Therefore, this formal report can provide a strong reference to recruiting new programmers in the coding team.

## Data Selection

The request for the survey was announced to 10 lab members during the weekly coding team meeting at Visual Cognition Lab with a brief explanation of what the survey entails. The lab members consist of 6 programmers and 4 researchers with the members being undergraduate or graduated with 6 months. Eight people responded to the survey within a week. The survey is composed of three major parts: 1) Current needs, 2) Qualification of applicants, and 3) Recruitment process. In this section, each major part with be explained in detail supported by graphs, qualitative data, and interview responses.

### *Current Need*. The current need is to determine the number of backlog experiments, the number of additional programmers, and the project of higher priority.

**Number of Backlog Experiments**

Throughout weekly lab meetings, there were frequent issues brought up by the researchers about the delay of experiment deployment due to experiments not being coded. This issue was invested by a survey question asking “how many experiments are required to be coded?” (Figure1). From the data collected, only one participant responded that there is only one backlog experiment to be coded. Three participants responded there are three experiments to be coded and four participants responded that four or more experiments are waiting to be coded. This raises a significant issue since conducting experiments is the main portion of the research. This further explains the frustration the researchers expressed during weekly team meetings. When asked about the current situation with the lack of developers during an interview, most researchers have expressed the need for management to hire more programmers. They also mentioned that existing programmers are given large responsibilities and expressed their concerns. This result clearly calls for an action from the managers to hire new programmers.

Figure 1

**Number of Additional Programmers**

 Currently, there are only 5 programmers in the lab with only 3 active members. The lack of programmers has caused projects to be delayed since the summer of 2021. According to Figure 2, two participants responded that three programmers are required in the coding team while six participants responded that four or more additional programmers are required in the team. When the survey was developed, it was expected that most people will answer in the range of one to four but most participants answered four or more. A more insightful question can be developed if the question is asked about a number instead of multiple questions to determine the upper bound of the additional programmers required. According to the interview, participants have mentioned hiring more experienced developers can relieve the pressure they are feeling now. This result from the survey and interview further supports the need for new programmers at Visual Cognition Lab.

Figure 2

**Project of Higher Priority**

There are two projects that are currently working on in the coding team: content platform web application and experiment web application. The content platform web application is focused on developing a website that displays the timeline of experiment development and a brief introduction to different teams in the lab. On the other hand, the experiment web application is used to conduct experiments online to gather data for researchers to analyze. The content platform has two active programmers while the experiment only has one. The experiment web application takes a higher priority because researchers are dependent on the programmers to complete coding the experiments. In contrast, the content platform web application does not have a strict deadline since it is not directly used for research but can greatly help lab members to keep track of their work and used to introduce different projects to people unassociated with the lab. According to the survey, 75% (6) of the participants said experiment web application takes on priority while 25% (2) of the participants said content platform web application should take precedence. However, it is important to note that at least three researchers have participated in the survey and most likely selected the experiment web application instead of the content platform web application.

Figure 3

### *Qualification of Applicants.* The qualification of applicants is determined by desired skills, technology, years of experience, and the number of programming courses taken.

**Desired Skill**

When recruiting new programmers we are interested in knowing what skills are important. As seen in figure 4, 50% (4) of participants responded that interest in the most desired skill when recruiting new programmers, 38% (3) of participants responded that behavioural skill is most important, and 12% (1) of participants responded that technical skills are most important. This was an interesting result since the position requires basic programming knowledge. Most people responded in interest because the position is a volunteer position with minimum obligation from the programmers. Therefore, it is highly preferred for new recruitment should be self-motivated and is interested in either research or programming. Furthermore, behavioural skill is an essential part of working in our lab because there is frequent communication between the researchers and the programmers. They must coordinate and communicate effectively to produce a desirable outcome. Through the interview, a participant mentioned that technical skills can be learned more time while taking computer science courses but interest and behavioural skills are relatively harder to develop over time. Therefore, based on the response of the survey and interview question, it is clear that we should look for applicants with strong interest and behavioural skills with technical skills as a desired skill.

Figure 4

**Technology**

When recruiting new programmers it can be helpful to know what technology they are familiar with. Both of the projects are mainly built using JavaScript, HTML, CSS, and use Git as version control. As seen in Figure 5, all of the eight participants responded JavaScript and Git, seven responded that HTML is a requirement, six responded that new hires need to know CSS, only one responded python, and two participants responded D3 as a requirement. When constructing the advertisement, we can state JavaScript and Git as a requirement technology and HTML, CSS, Python, and D3 as desired technology.

Figure 5

#### **Years of Experience and Number of Programming Courses Taken**

According to the survey, for a qualified applicant, the average year of experience was 0.24 and the average number of programming courses taken was 2.8. Considering that inexperienced programmers are likely to struggle to contribute to the current codebase, our lab prefers programmers with basic background knowledge and experience in computer science. Therefore, we should target students who are at least in second year when recruiting.

### *Recruitment Process.* The recruitment process is determined by method of advertisement and time of recruitment.

#### **Method of Advertisement**

Once we determined the need and desired qualifications of the applicants, we must determine the effective method for the advertisement. Five out of eight participants heard about their current position through school email, one participant found it through the Visual Cognition Lab main website, and two participants heard the position through a friend. Therefore, when constructing advertisements, we should heavily utilize school email while also encouraging lab members to refer people to the lab. During the interview, a participant mentioned using a bulletin board in the computer science building could be useful.

Figure 6

**Time of Recruitment**

The time of recruitment should also be considered to effectively hire new programmers. Based on Figure 7, five participants responded that they applied to their current position at the start of the term while only one person each for the middle, end of the term, and between terms. This is most likely because students are busy during the middle and end of the term, and do not frequently check school emails. Also, students are less stressed and burnout during the start of the term and are more likely to find other opportunities outside of school. It was expected that many participants applied between the terms when it is less busy but only had one response.

Figure 7

**Conclusion**

* Visual Cognition Lab requires programmers to build experiments used for research
* There is a need for additional programmers in the coding team to prevent experiments from being delayed
* The coding team is interested in hiring a programmer who shows interest, has the experience, have taken a computer science course, and knows some relevant technology
* Most members joined the lab through email that was sent out during the start of the semester

**Recommendation**

* Hire paid developers
* Recruit students interested in directed studies focused on computer science
* Put more time and resources into recruiting more programmers
* Send out emails during the start of the term to increase the chance of finding applicants
* Focus on finding applicants who show interest in volunteer position