Perspectives on the student transition into CS1.

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Perspectives on the Student Transition into CS1

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ABSTRACT

As students transition into higher education, their experience can be quite new and foreign to them. This experience, while an individual one, consists of many concerns that are shared amongst these transitioning students. Partly as a result of these concerns, retention rates of first year Computer Science students suffer. Members of this panel have been involved in multi-year studies across Scotland [2, 5] as well as an international study [3] looking at the student experience as they transition into undergraduate Computer Science.

This panel hopes to discuss the transition into CS1 and implications for Computer Science retention rates from varied international perspectives as well as through the lens of online learning. It further hopes to discuss new ways that we might be able to better support first year CS student retention in light of collected transition data, as well as the current state of any implemented recommendations in previous work.

CCS CONCEPTS
• **Applied computing → Education** • **Social and professional topics → CS1.**

KEYWORDS
Concerns; Transition; CS1; Applicants; Retention; Higher Education

1 SUMMARY

As students transition into higher education computer science, their experience can be quite new to them (especially for students who are first in their family to attend higher education), with some viewing the prospect of higher education as a foreign entity [1]. This experience, while an individual one, consists of many concerns that are shared amongst these transitioning CS1 (first year Computer Science) students irrespective of background, culture or institution. Partly as a result of these concerns, retention rates of first year Computer Science students suffer.

Members of this panel have been involved in multi-year studies across Scotland [2, 5] as well as an international study [3] looking at the student experience and self-reported concern as they transition into undergraduate Computer Science. Following three years of data collection across Scotland, where over 700 prospective CS1 students were surveyed [2, 5], an international investigation was launched via a Working Group at ITiCSE 2018. While differences exist, the collected data revealed several consistencies between relative areas of concern across nations, gender and delivery methods [3].

The internationally-collected data showed that topics such as concern regarding failing, and those such as time management, workload expectation, being good at the course and choosing the right degree were amongst the top concerns [3]. These were followed by concerns regarding housing costs, securing good employment, and the availability of academic staff [3].

The panel will look at how these concerns are addressed within the Computer Science departments across the three countries represented within the panel as well as within the distance learning environment. Traditionally, higher education institutions put in an effort to target concerns such as applying for scholarships, homesickness, finding roommates and finding part-time jobs through dedicated careers services. However, year after year, those topics were all in the bottom half of the rankings in the survey conducted [3].

Analysis of the gathered data from the ITiCSE Working Group will help us understand which concerns appear to be the most pressing when students are transitioning into CS1. The panel will hope to bring together international educators to discuss how to best support and retain our first year Computer Science undergraduates.

In this panel, each member will discuss how the student transition experience is supported within their own university, how the collected data has shaped the ways in which they view student support for CS1 students differently and suggest ways in which we might rethink student support moving forward. The goal of this panel will be to help identify ways in which we can help tackle these concerns and allow us to improve and enhance the student experience through better understanding of the transition experience of CS1 students.

2   PANEL STRUCTURE

The moderator will first give a brief background to the topic, highlighting the key research into student transition into CS1. Each panelist will then be given 10 minutes to present their respective positions as well as an overview of data collected from their home institution, including those from three countries (Canada, the United Kingdom and Sweden) as well as from the perspective of online learning. Following the presentation, the moderator will facilitate the audience discussion. We anticipate questions about how student retention efforts could be improved in light of collected data and how this and ongoing research might redirect our focus when it comes to better supporting our CS1 students.

3   PANELISTS

The panel is comprised of the following four members:

3.1   Angela Siegel (Moderator)

As the CS Undergraduate Chair in a large Canadian University, I help support roughly 400 incoming undergraduate CS1 students each semester. My primary focus is on instructional support and development within the Faculty of Computer Science at Dalhousie University. I am currently in the process of supporting a complete review of all first-year offerings within our Computer Science and Applied Computer Science programs. My interest in successful transitions has led me to consider how we can better incorporate student concerns into our curriculum and teaching practice. Work in this area includes helping set student expectations early in their undergraduate career through the use of autograding softwares and the utilization of smaller problems of the day to emphasize time management and the importance of practicing ones craft.

Mark Zarb and I were awarded a Higher Education Academy grant in 2015 to explore transitions to higher education CS within Scotland. After this initial project, we surveyed and spoke to over 700 applicants about their concerns, resulting in the organization of a national workshop [5], a number of invited talks at national conferences and international publications [2, 3]. After these initial investigations of student transitions in Scotland, I have enjoyed continuing this work within Nova Scotia, Canada.

3.2   Mark Zarb

I am a Senior Lecturer and Course Leader within the School of Computing Science and Digital Media at the Robert Gordon University (RGU) in Aberdeen, Scotland. My main research area is in computing education, looking at ways to improve the student experience throughout their time in higher education, from application to graduation. In addition to the work that Siegel and I have completed together, I led a Working Group at ITiCSE 2018, bringing together an international team of educators to consider student transition concerns

from this international perspective with two of the other panelists [3].

3.3   Richard Glassey

I am a lecturer at KTH Royal Institute of Technology in Stockholm, Sweden. My main responsibility is to welcome and support the first year cohort to their exciting journey into Computer Science. Despite an intake of 200 students, I endeavour to make the first year experience feel cosy, connected and involved. Despite all our differences, each student at KTH should feel equal, respected and empowered to be the best they can in their education. My research focus aims at moving computer science education forward by lifting the standards of what we can achieve with our first year experience. Also, I have investigated the concerns of students in their transition to first year in Swedish context, and how this compares with other countries [3].

3.4   Janet Hughes

As a Staff Tutor with the Open University based out of Edinburgh in the United Kingdom, I am concerned about the experience of part-time learners studying in a supported distance learning environment. Student concerns in this realm can differ slightly from those in the classroom, particularly for those studying whilst working full-time and for different groups of non-traditional learners. Not only do we need to support similar needs of students as in a traditional classroom education, but we must also consider additional factors, such as self-efficacy and time management, that can be particularly important in a distance learning environment.

REFERENCES

[1] P. Askham. (2008) Context and identity: exploring adult learners' experiences of higher education. *Journal of Further and Higher Education.*

[2] A.A. Siegel and M. Zarb. (2016) Student concerns regarding transition into higher education CS. *Annual Conference on Innovation and Technology in Computer Science Education, ITiCSE* (Arequipa, Peru, 2016).

[3] M. Zarb, B. Alshaigy, D. Bouvier, R. Glassey, J. Hughes, and C. Riedesel. (2018) An International Investigation into Student Concerns regarding Transition into Higher Education. In *Proceedings of 23rd Annual ACM Conference on Innovation and Technology in Computer Science Education* (ITiCSE'18). ACM, New York, NY, USA, 20 pages. https://doi.org/10.1145/3197091.3205842

[4] M. Zarb, and A.A. Siegel. (2016) SICSA Education Workshop http://www.sicsa.ac.uk/events/sicsa-education-workshop-student-   transitions-within-computing/

[5] M. Zarb and A.A. Siegel. (2018) An Analysis of Pupil Concerns regarding Transition into Higher Education. In *Higher Education for All,* (HEFA 2017, Maceió, Brazil, March 20–24, 2017). A. I. Cristea et al. (Eds.), CCIS 832, Springer, 3–16. https://doi.org/10.1007/978-3-319-97934-2