Notice of the Final Oral Examination for the Degree of Doctor of Philosophy of

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“An Exploration of Learning Tool Log Data in CS1: How to Better Understand Student Behaviour and Learning”

Department of Computer Science

Thursday, January 12, 2017  
9:30 A.M.  
Engineering and Computer Science Building  
Room 468

Supervisory Committee:
Dr. Yvonne Coady, Department of Computer Science, University of Victoria (Supervisor)  
Dr. Alona Fyshe, Department of Computer Science, UVic (Member)  
Dr. Marc Klimstra, School of Exercise, Science, Physical and Health Education, UVic (Outside Member)

External Examiner:  
Dr. Steve Wolfman, Department of Computer Science, University of British Columbia

Chair of Oral Examination:  
Dr. Michael Emme, Department of Curriculum and Instruction, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

The overall goal of this work is to support student success in computer science. First I introduce BitFit, an ungraded practice programming tool. BitFit was built to provide students with a pressure-free environment to practice and build confidence working through weekly course material. BitFit was used in an introductory programming course, CSC 110, at the University of Victoria for 5 semesters in 2015 and 2016. The contributions of this work are a number of studies done analyzing the log data collected by BitFit over the past two years. First, I explore whether patterns can be identified in log data to differentiate successful from unsuccessful students, with a specific focus on identifying students at-risk of failure within the first few weeks of the semester. In the second study, I separate out only those students who struggle early in the semester, and examine their changes in programming behaviour over time. The goal behind the second study is to differentiate between transient and sustained struggling, in an attempt better understand the reasons successful students are able to overcome early struggles. Overall, this work provides insight into the factors contributing to behavioural change, with the hope this information can aid educators in providing supportive intervention aimed at guiding struggling students towards more productive learning strategies.