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BENJAMIN XIE

Ph.D. Candidate

RESEARCH INTERESTS: I am a human-computer interaction (HCI) researcher who designs interactive tools to support equity in computing education. I engage with the fields of HCI, computing education, artificial intelligence in education, and psychometrics.

EDUCATION

2016-	**University of Washington**, Seattle, WA Ph.D. in Information Science Advisor: Amy J. Ko
2015-2016	**Massachusetts Institute of Technology**, Cambridge, MA M.Eng. in Computer Science Thesis: *Progression of Computational Thinking Skills Demonstrated by App Inventor Users* Advisor: Hal Abelson
2011-2015	**Massachusetts Institute of Technology**, Cambridge, MA B.S. in Computer Science Advisor: Hal Abelson

ACADEMIC EXPERIENCE

2020	**Code.org**, *Research Intern.* Mentor: Baker Franke
2016-	**UW Code & Cognition Lab**, *Graduate Research Assistant.* Mentor: Amy J. Ko
2015-2016	**MIT App Inventor**, *Graduate Research Assistant.* Mentor: Hal Abelson
2014-2015	**MIT App Inventor**, *Undergraduate Research Assistant.* Mentor: Hal Abelson
2012-2013	**MIT Education Arcade**, *Undergraduate Research Assistant.* Mentors: Judy Perry, Lisa Stump

PROFESSIONAL EXPERIENCE

2015	**NovoEd**, Software Engineering Intern
2014	**AppNexus**, Software Engineering Intern, API Team
2013	**eBay**, Software Engineering Intern, Marketplace Team

AWARDS & HONORS

2020	National Science Foundation (NSF) INTERN Recipient
2016-2021	National Science Foundation (NSF) Graduate Research Fellowship
2014-2015	MIT EECS - Google Research and Innovation Scholar
2013-2016	USTFCCCA All-Academic Honoree in Cross Country, Track

PEER-REVIEWED PUBLICATIONS

Formally reviewed/refereed content that is rigorously reviewed by peer experts as well as journal editors or conference program committee members.

The Effect of Informing Agency in Self-Directed Online Learning Environments
B. Xie, G. L. Nelson, H. Akkaraju, W. Kwok, A. J. Ko (2020)
L@S: ACM Conference on Learning at Scale
Designed and evaluated three variations of self-directed online learning tool to explore how informing and affording agency affected engagement and learning outcomes

Investigating Novices' In Situ Reflections on Their Programming Process
D. Loksa, *B. Xie*, H. Kwik, A. J. Ko (2020)
SIGCSE: ACM Technical Symposium on Computer Science Education
Presented evidence that self-regulation use during programming varies, and that teaching self-regulation skills may require targeted instruction based on students' self-regulation and programming practices

Towards a Validated Formative Assessment for Language-Specific Program Tracing Skills
G. L. Nelson, *B. Xie*, A. Hu, A. J. Ko (2019)
Koli Calling
Developed formative assessment with Kane's validity framework and situated framework within computing education

An Item Response Theory Evaluation of a Language-Independent CS1 Knowledge Assessment
B. Xie, M. J. Davidson, M. Li, A. J. Ko. (2020)
SIGCSE: ACM Technical Symposium on Computer Science Education
Evaluated SCS1 language-agnostic concept inventory, using Item Response Theory to identify items that were problematic

A Theory of Instruction for Introductory Programming Skills
B. Xie, D. Loksa, G. L. Nelson, M. J. Davidson, D. Dong, H. Kwik, A. H. Tan, L. Hwa, M. Li, A. J. Ko (2020)
CSE: Computer Science Education (journal)
Proposed theory of instruction to teach four distinct programming skills incrementally: tracing, writing syntax, comprehending reusable programming abstractions (templates), applying templates. Demonstrated that teaching these skills resulted in improvement in certain learning outcomes

Experiences of Computer Science Transfer Students
H. Kwik, *B. Xie*, A. J. Ko (2018)
ICER: ACM International Computing Education Research Conference
Investigated experiences of computer science students who transferred to a university, finding that university interventions helped support social transition but did not eliminate gaps in academic performance

An Explicit Strategy to Scaffold Novice Program Tracing
B. Xie, G. L. Nelson, A. J. Ko (2018)
SIGCSE: ACM Technical Symposium on Computer Science Education
Described and evaluated a simple but powerful strategy to scaffold tracing of program execution. With ‹30 min of practice, novices in intro CS course had midterm grades 7% higher than a control group

Comprehension First: Evaluating a Novel Pedagogy and Tutoring System for Program Tracing in CS1
G. L. Nelson, *B. Xie*, A. J. Ko (2017)
ICER: ACM International Computing Education Research Conference
Contributed a new theory of what it means to know a programming language, instruction based on their theory, and a computer-based tutorial for teaching this knowledge. Found that the tutorial resulted in improved learning gains

Skill Progression in MIT App Inventor
B. Xie, H. Abelson (2016)
VL/HCC: IEEE Symposium on Visual Languages and Human-Centric Computing
Found that long-term users of App Inventor tend to expand breadth of programming knowledge (use new blocks) before depth (use blocks in more complex ways)

Measuring the Usability and Capability of App Inventor to Create Mobile Applications
B. Xie, I. Shabir, H. Abelson (2015)
PROMOTO: Workshop on Programming for Mobile and Touch
Investigated the usability and realized capability of ›5,000 App Inventor projects, finding that the order of App Inventor tutorials heavily influence the usability of App Inventor to implement particular functionalities

Curated Publications

Content selected from submissions or invited by magazines editors or conference chairs. This content was not necessarily reviewed by a committee.

Learning and Education in HCI: A Reflection on the SIG at CHI 2019
V. Pammer-Schindler, E. Harpstead, *B. Xie*, B. DiSalvo, A. Kharrufa, P. Slovak, A. Ogan, J. J. Williams, M. J. Lee (2019)
IX: ACM Interactions Blog
Follow-up report on our CHI 2019 SIG on learning, education, and

Learning, Education, and HCI
B. Xie, E. Harpstead, B. DiSalvo, P. Slovak, A. Kharrufa, M. J. Lee, V. Pammer-Schindler, A. Ogan, J. J. Williams (2019)
CHI: ACM Conference on Human Factors in Computing Systems
Proposed special interest group to foster the intersection of HCI and learning sciences.

Doctoral Colloquium

Opportunities for doctoral students to engage with their peers and faculty members in intellectual interactions to advance their research.

Supporting Equity in Computing Education with Student-Led Interactions with Data
B.Xie, UW DUB Doctoral Colloquium 2020

Human-AI Collaborations within Computing Education
B. Xie, iConference 2019

Teaching

Instructor	UW INFO 370: Introduction to Data Science (Fa '17)
Teaching assistant	UW INFO 201: Technical Foundations of Informatics (Fa '19)
	UW INFO 461: Cooperative Software Design (Sp '17)
	Prospect Hill Academy Intro to Computer Science (Fa '14, Sp '15)

Service

Reviewer	CHI (2018, 2020), UIST (2019), TOCE (2019), SIGCSE (2018, 2019), ICIS (2020), Journal of Information an Learning Sciences (2018)
Program committee	EECScon: MIT EECS Undergrad Research Conference (2014, 2015)
Student Co-ordinator	UW DUB Seminars (2019), UW DUB Doctoral Colloquium (2019), UW DUB PhD Student Retreat (2018), UW Information School PhD Retreat (2018)
Mentor	Technology Access Foundation (TAF) Academy STEM Expo (2016-2019)
	Google Summer of Code (on behalf of MIT Media Lab, 2016)
Educational Counselor	Massachusetts Institute of Technology (2016-2019)

STUDENTS SUPERVISED

2019	Christina Zhang, UW
2018-19	William Kwok, UW. First position: Qualtrics
	Harshitha Akkaraju, UW. First positon: Microsoft
2018	Jane Quichocho, UW
2017	Alex Hui Tan, UW. First position: Hazel Analytics
	Leanne Hwa, UW. First position: Deloitte
2016-2018	Harrison Kwik, UW. First position: PhD at Northwestern TSB
2016	Abhijit Suresh, CU Boulder via Google SoC. First position: Ph.D. at CU CS
	Sylvan Tsai, MIT. First position: Amazon
2015-16	Xinyue Deng, MIT. First position: Master's at MIT EECS