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BENJAMIN XIE

Ph.D. Candidate

RESEARCH INTERESTS: I design interfaces to explore interpretations and uses of data for equity in computing education. I engage with the fields of human-computer interaction (HCI), computing education, and learning at scale.

EDUCATION

- 2016- **University of Washington**, Seattle, WA
Ph.D. in Information Science
Advisor: Amy J. Ko
M.S. in Information Science (2019)
- 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 Google Cloud Academic Research Grant
- 2020 National Science Foundation (NSF) INTERN Recipient
- 2016 National Science Foundation (NSF) Graduate Research Fellowship
- 2015 MIT EECS - Google Research and Innovation Scholar

PEER-REVIEWED PUBLICATIONS

Content that is rigorously reviewed by peer experts as well as journal editors or conference program committee members.

Domain Experts' Interpretations of Assessment Bias in a Scaled, Online Computer Science Curriculum

B. Xie, M. J. Davidson, B. Franke, E. McLeod, M. Li, and A. J. Ko (2021)

L@S: ACM Learning at Scale

Explored a new use of Differential Item Functioning (DIF) where domain experts (Code.org curriculum designers) interpreted data on potential test bias by gender and race.

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 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 Symp. on CS 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 (2019)

SIGCSE: ACM Technical Symp. on CS 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 (2019)

CSE: Computer Science Education Journal

Proposed theory of instruction to teach four distinct programming skills incrementally and 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 Int'l Computing Education Research Conf.

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 Symp. on CS 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 Int'l Computing Education Research Conf.

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 Symp. on Visual Languages & 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.

How Data Can Support Equity in Computing Education

B. Xie (2020)

XRDS: ACM Crossroads Magazine

Article describing techniques I am exploring in my dissertation to use data to support equity in computing education.

It Is Time for More Critical CS Education

A. J. Ko, A. Oleson, N. Ryan, Y. Register, B. Xie, M. Tari, M. J. Davidson, S. Druga, D. Loksa (2020)

CACM: Communications of the ACM

Position article calling for more critical lens to computer science education.

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 HCI

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 Conf. on Human Factors in Computing Systems

Proposed special interest group to foster the intersection of HCI and learning sciences.

INVITED TALKS

Discussing “How Data Can Support Equity in Computing Education”

B. Xie (2021)

Princeton CITEP TechEd Reading Group

Discussed my XRDS 2020 article.

Equitable Learning Analytics - Why should everyone care

D. Gasevic, R. Ferguson, L. Lawrence, B. Xie (2021)

Learning Analytics & Knowledge (LAK)

Panel to bring awareness to gaps in diversity, equity, and inclusion practices for learning analytics community.

DOCTORAL COLLOQUIUM/ CONSORTIUM

Opportunities for doctoral students to engage with peers and faculty members 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 371: Advanced Methods in Data Science (Wi '21) 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)
GUEST LECTURER	UW INFO 371: Advanced Methods in Data Science (Wi '21). Topic: Gradient Descent UW STAT 423: Applied Regression and Analysis of Variance (Wi '19). Topic: Exploratory Data Analysis

SERVICE

PROGRAM COMMITTEE	COMPASS: ACM Conf. on Computing and Sustainable Societies (2021), EECScon: MIT EECS Undergrad Research Conference (2014, 15)
REVIEWER	CHI (2018, 20, 21), UIST (2019), TOCE (2019), SIGCSE (2018, 19), ICIS (2020), Journal of Information and Learning Sciences (2018)
STUDENT COORDINATOR	UW HCI Seminar (2020-21), UW DUB Seminar (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 (2016-21)
COMMUNITY	Head of Education Co-op: Seattle Data for Good (2017-18); Volunteer: Street Youth Ministries (2017)

STUDENTS SUPERVISED

2019	Christina Zhang, UW
2018-19	William Kwok, UW. First position: Qualtrics Harshitha Akkaraju, UW. First position: 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

Updated April 1, 2021