Learning, Education, and HCI

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ABSTRACT

In this SIG, we propose a gathering of researchers and practitioners thinking about HCI in learning and educational contexts to foster an ongoing Learning and Education community at CHI. With the recent increase in CHI submissions relating to learning (40% more submissions than previous CHI), this SIG is an opportunity to foster an inclusive dialogue on designing and studying phenomena, tools, and processes related to learning and education. This SIG will bring together researchers, educators, and practitioners with three goals in mind: (1) discussing more inclusive cross-disciplinary perspectives on learning; (2) defining future directions and standards for learning and education contributions in CHI; and (3) building community across research/practice boundaries.

INTRODUCTION: LEARNING AND EDUCATION, A GROWING FOCUS AT CHI

This SIG is an opportunity to have a cross-disciplinary discussion on the impact of HCI and design on learning and education. Recent HCI research relating to learning and education has grown, as evidenced by its increasing presence in CHI. CHI '19 saw the formation of the *Learning, Education, and Families* subcommittee, which received over 190 submissions (an increase of over 40% from the previous year). This signals a growing interest in HCI within educational contexts. Recent HCI research has considered the use of technology in formal domains (e.g. activity trackers in classrooms [4]), informal domains (e.g. joint media engagement in community centers [2]), and digital domains (e.g. online Scratch users creating digital media [3]). While there are many publications at CHI related to learning, they often have diverse perspectives on what learning is, who is involved, where it occurs, and how it is studied. This SIG seeks to develop the learning, education, and HCI community by bringing people together to discuss different dimensions of learning and their affordances.

The goal of this SIG is to bring together people with multiple perspectives and expertise to discuss HCI, learning, and education research, and to foster the emerging HCI learning community.

DISCUSSION: DEFINING MORE INCLUSIVE PERSPECTIVES ON LEARNING

To help in building a sense of community we will host discussions around learning and education as they relate to HCI. We will specifically focus on three fundamental dimensions of HCI, learning, and

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Focuses of related learning communities
AIED (Artificial Intelligence in Education). "computer science, education and psychology...interactive and adaptive learning environments." http://iaied.org

CSCL (Computer-Supported Collaborative Learning). "learning through collaboration and promoting productive collaborative discourse with the help of the computer and other communications technologies." https://www.isls.org/conferences/cscl

IDC (Interaction Design and Children) "inclusive child-centered design, learning and interaction" https://sigchi.org/conferences/conference-history/idc/

ICER (International Computing Education Research) "how people come to understand computational processes and devices, and how to improve that understanding" http://sigcse.org/sigcse/events/icer

ICLS (International Conference of the Learning Sciences) "learning as it exists in real-world settings and how learning may be facilitated both with and without technology" https://www.isls.org/conferences/icls

L@S (Learning at Scale). "large-scale, technology-mediated learning environments with many learners and few experts to guide them" https://learningatscale.acm.org

LAK (International Conference on Learning Analytics & Knowledge). "design of analytics systems to debate the state of the art at the intersection of Learning and Analytics." https://solaresearch.org/events/lak/

education in a cross-disciplinary setting. First, the more theoretical dimension of considering the roles of learning theories in HCI and design. Second, in the pragmatic dimension of how advancements in HCI can advance learning and vice versa. Finally, we will consider how evaluation of learning contexts can be understood in HCI.

Cross-disciplinary perspectives on learning

Just as HCI has a plurality of theories, methods, and perspectives, so does learning. For example, the Computer-Supported Collaborative Learning (CSCL) community often takes a more qualitative approach to observing learning as a phenomenon. Recent CSCL-related work at CHI have investigated families jointly engaging in computer programming [2] and designing sociotechnical systems to facilitate learning across neighborhoods [1].

In contrast, the Learning Analytics and Knowledge (LAK) community often takes more quantitative approaches to measuring observed performance and behavior. Recent LAK-related work at CHI have compared the design of different educational technologies by tracking multiple metrics for 7th and 8th grade students using them [5] and measured the effect of an intervention in the large online Scratch community [3]. Different approaches to studying learning and education enable us to think about learning from different perspectives. We seek to foster an awareness and understanding of the different perspectives of learning that are brought to bear within the CHI community.

To do so, we will discuss questions relating to the use of theory and design in HCI and learning research: How can we use learning sciences, cognitive science, HCI, and other theories in our research? What are the affordances and trade-offs of different framings of learning? How domain-specific (e.g. computing education) or population-specific (e.g. high school students of color from low SES backgrounds) should our research be?

How HCI can advance learning; how learning can advance HCI

The CHI community is rich in HCI expertise relating to different ways groups engage with technology and this expertise can help advance learning. But there is also a reciprocity where many HCI challenges can be framed as learning challenges. We want to better understand this synergistic relationship between the broader HCI community and the growing subgroup of learning researchers within it.

We plan to discuss questions relating to how HCI can advance learning and also how learning can advance HCI. What can we learn from related communities? How can we protect, engage, and benefit stakeholders (e.g. educators, learners, communities) in our research and the potential impact of our work? How can we be inclusive in the designs of personalized learning experiences? What are the crucial questions in learning that HCI is best positioned to support?

Agenda

Our agenda will seek to promote community building and knowledge sharing. During this SIG, we will open with a short exercise to break attendees up into discussion groups ensuring each group contains a mix of perspectives. We will center discussions around curated "artifacts" (descriptions of diverse theories, frameworks, and exemplar papers) which can serve to guide these groups as they discuss each of our three themes: Different perspectives on learning, the relationship between Learning and HCI, and evaluating and assessing learning and education work in the CHI context. Finally, we will conclude with an open discussion relating to how we can support learning and education in CHI and beyond and how we can foster communication to maintain a sense of shared community going forward.

Expected Outcomes

This SIG will enable community building and knowledge sharing, and our expected outcomes will help these efforts persist and develop.

- To encourage networking and collaborations, we plan to create an online group, opt-in messaging list, and curated list of researchers with their research topics contact information.
- To help people find new communities, we plan to curate a list of relevant learning and education venues with descriptions.
- To help foster this subcommunity of HCI and learning researchers, we plan to archive the findings of this SIG, including guiding research questions and future directions. This SIG will provide the learning, education, and HCI community with a broader perspective on how to investigate learning and the resources to collaborate with others.

What are differing standards for evaluating learning and education work within the CHI community?

How should we evaluate learning and education work within the CHI community? Evaluation and assessment of learning can be a difficult task at any time and in informal or computational settings, there are additional dimensions to consider. For example, in online learning tools, students are not required to take tests, engagement is not persistent, context can change rapidly, and learning goals can be difficult to define. Furthermore, distinctions between evaluation and assessment can be difficult to define in the design process.

Evaluation of a learning technology shares many similarities to other technology deployments in that it is studying the whole project, such as usability, social context, access to technology, motivation, and engagement. In contrast, assessment of learning goals is unique and more specific. Recently we have seen that technology has great potential to provide both formative and summative assessment of specific learning outcomes in ways that scale beyond what human actors can do. In these ways, evaluation and assessment cover a broad range of techniques and approaches.

To address this range of approaches and build synergies among SIG members, we plan to discuss questions relating to: What aspects of evaluation are most useful in an HCI context? Are there a set of criteria that should be used for evaluation? How can formative assessment be conducted and leveraged in the context of learning technology? In what ways should evaluation and assessment inform design practices for learning technology?

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