PROMOTION RECOMMENDATION
The University of Michigan
School of Education

Christopher L. Quintana, assistant professor of education, School of Education, is recommended for promotion to associate professor of education, with tenure, School of Education.

Academic Degrees:
Ph.D. 2001  Computer Science & Engineering  University of Michigan
M.S. 1995  Computer Science & Engineering  University of Michigan
B.A. 1990  Biological Sciences  University of Texas at El Paso

Professional Experience:
2003–present  Assistant Professor, School of Education, University of Michigan
2001–2003  Assistant Research Scientist, School of Education, University of Michigan

Summary of Evaluation:

Teaching: Professor Quintana has taught a variety of courses within the Learning Technologies specializations at the master’s and doctoral levels, including both required and elective courses in the specialization area and one course outside of the Learning Technologies area. His teaching has been primarily in courses focused on learning technologies and software design and evaluation. This includes the regular teaching of “Principles of Software Design for Learning” (EDUC 626), “Classroom-based Evaluation of Learning Technologies” (EDUC 603), the periodic teaching of “Learning Technologies Across the Content Areas” (EDUC 601) and “Designing Science Education Learning Environments” (EDUC 834). Professor Quintana worked hard to improve his teaching over time, and improvement is evident in the increasingly favorable student evaluations of his courses. His most recent teaching evaluations place him in the highest performance quartile. The program chair’s letter, students’ evaluation comments, syllabi, and a publication that explains his course design strategy all show that he puts significant effort into class preparation and into helping his students learn and that his efforts are appreciated by the students in his classes. Two external reviewers singled out Professor Quintana’s chapter on the design of his learning technologies course as a significant contribution to the field about what it means to do design-based instruction well.

He has also provided valued mentorship through his supervision of internships and independent study projects for Learning Technologies students and through his service on master’s and doctoral committees, including several that he has chaired. He has supervised two doctoral dissertations and has served as a member of seven dissertation committees, including three for students in Education, two in Nursing, and two in Engineering. He is currently serving on three more dissertation committees (two in Education and one in the School of Information), and is advisor to two other doctoral students. He has supervised a master’s thesis in the School of Education and was a committee member for an MFA student in the School of Art and Design. The range of units across the university in which Professor Quintana is asked to serve in these supervisory and advisory roles is one indicator of the diverse nature of his expertise as a teacher and mentor.

Research and Scholarship: Professor Quintana situates his work at the intersection of several distinct fields of scholarly inquiry, including the learning sciences, computer science, human-computer interaction (HCI), and information design. According to the external reviewers, Professor Quintana is already viewed as a nationally prominent leader for his work with learner-centered design, where
he is known both as a gifted designer of technological learning tools and as a scholar who provides insight into the principles that support effective learning using such tools, especially with respect to principles that undergird the design of scaffolding supports. Because Professor Quintana works within a multidisciplinary space, his work receives critical attention from multiple scholarly audiences, including learning sciences, computer science and education (especially science education, which reflects the educational subject matter associated with most of the software he has designed). His work is also of interest to a variety of audiences with different goals for its use, including software designers/developers, software users/clients and evaluators of interventions.

His record of scholarly activity during his six years as an assistant professor comprises three articles published in peer-reviewed research journals (including two of the most highly regarded and influential education research journals), more than a dozen papers published in refereed conference proceedings (including the highly prestigious ACM-CHI and ICLS conferences), and four book chapters (including a chapter in the major research handbook in the learning sciences). Conference proceedings in both computer science and in the field of learning sciences are a well-regarded and preferred form of professional communication because they become available at or soon after a conference and often online as well as in print, and their selectivity is comparable to top tier research journals in education. This approach to dissemination is necessary and desirable in these fast-moving fields. As noted by some of the external reviewers, in the field of computer science, publications in prestigious conference proceedings are considered to be equivalent to journal articles. One reviewer noted that Professor Quintana is rare among scholars in education and extraordinary among young scholars in computer science for his frequent publications in ACM conference proceedings.

The external reviewers noted that Professor Quintana is a scholar trained as a computer scientist who is now working in areas that tend to be dominated by social science perspectives. Their evaluations suggest that Professor Quintana has managed well the challenges of being a boundary-crosser. Several key features of Professor Quintana’s work were highlighted across the external reviews and were important to the school’s evaluation of his record. His scholarship was seen as: (1) integrative and synthetic, drawing skillfully on concepts and theory from different areas (e.g., cognitive theory, computer science, education) and contributing effectively to multiple communities; (2) combining both highly developed technical skills of software design and in-depth knowledge of relevant theories of learning and human-computer interaction; and (3) focusing on core problems of practice. Reviewers noted that his scholarly publications demonstrate the highly collaborative nature of the research domain in which he works, including close work with students on joint publications and conference presentations.

The quality and tier of the publications impressed both the external reviewers and the Promotion and Tenure Committee. For example, Professor Quintana’s Journal of the Learning Sciences paper and the follow-up publication in the Educational Psychologist were identified as seminal contributions to the field. The body of work to date establishes Professor Quintana’s credentials as a scholar of considerable talent and promise. The intellectual and practical significance of his work, its excellent quality, and its impact on a number of different domains of educational theory and practice are readily evident.

Selected Recent and Representative Publications
Goldman, & M. Chorost (Eds.), *Educating learning technology designers: Guiding and inspiring creators of innovative educational tools*. London: Routledge.


**External Reviews**

**Reviewer A:** “More than a decade ago, Elliot Soloway and colleagues, including Quintana, introduced the notion of Learner-Centered Design to the learning sciences and human-computer interaction communities. At that time it was an important notion because it expanded the field’s sense of what it meant to build software that was focused on more than usability but extended to what it meant for software to support learning. In the ensuing years Quintana has stayed the course on this topic and plowed new ground in helping us understand what it means to think about design in a learner-centered way. His contribution has been to explore in relatively nuanced ways how to bring scaffolding to the design of software meant for teaching and learning. It has been his insights, and those of his collaborators, that have been principally responsible for pushing those early ideas about learner-centered design to new depths.”

**Reviewer B:** “Dr. Quintana has decided to focus his scholarly work on one crucial aspect of learning technologies—scaffolding. There is a significant body of empirical research, grounded in theoretical frameworks, on the importance of scaffolding in learning and teaching. Numerous studies have illustrated how scaffolding and the fading are instrumental parts of successful learning. It is only in the last decade that learning designers have begun to implement aspects of this process in software thus creating what Guzdial initially called ‘software-realized scaffolds’. Quintana expands this work into new directions by bridging the ‘gulf of expertise’ that divides learners and experts. His main contribution is the integration of learning theory and research into a framework that was born in engineering usability tradition.”

**Reviewer C:** “Chris’s [sic] papers take that work in several new directions. First, they integrate into those foundations principles from social constructivist learning theory and present this more complete set of ideas about Learner-Centered Design to the education and learning sciences community. Second, they present guidelines (design patterns) for implementing scaffolding in software systems that are designed based on a social constructivist foundation. Third, they articulate criteria and practices for evaluating the effectiveness of software-realized scaffolding (‘effects with scaffolding’). Finally, they present several clever designs.”

**Reviewer D:** “In summary, Quintana has followed a progressing research program involving synthesis, software design, and empirical research. He draws on a wide literature and analyzes numerous software applications. This work is an amazing contribution to the field since it is difficult for researchers to appreciate the unique features of multiple software programs. Quintana’s syntheses capture the similarities and differences in the many inquiry-oriented applications that have been designed over the years. In addition, the research program reveals Quintana’s skill in mentoring graduate students who are making impressive contributions to the field.”
Reviewer E: “Although many people have created software for educational applications, Dr. Quintana’s work is distinctive because his development effort is integrally coupled to learning theory—specifically, the principles of scaffolding. Saying that LCD [learner-centered design] is different is not enough, we must identify the essential characteristics and then design and evaluate interventions based on these characteristics. One key distinction that Dr. Quintana makes for LCD is the role of change over time—the learning effects as people not only learn to use a system but manage the germane cognitive load of domain content. Scaffolding theory is particularly appropriate for LCD design because it focuses attention on flexible functions and supports that evolve and dissolve as learners construct their knowledge of the domain. This theory-driven approach to design is well-manifested in his early papers such as those in Advances in Computers (2003) and Journal of the Learning Sciences (2004) as well as the 2002 ACM CHI conference case study paper. The Advances in Computers paper has been especially influential with 40 papers in a variety of venues citing it. The Educational Psychologist paper (2005) ties theory to practice by illustrating how software can be designed to support three kinds of metacognitive functions as learners interact with new information resources. This work has implications in engineering and information science as well as education.”

Reviewer E: “By far the most important paper that Chris has published is the article in the Journal of the Learning Sciences published in 2004, presenting a scaffolding design framework for software to support science inquiry. This has had a significant impact on the field, with 49 citations (according to Scopus), despite only being published relatively recently. It is the most well developed articulation of the framework he has been working on and presents a number of specific examples of software that incorporate the guidelines described in the paper. These examples help to make concrete the framework and guidelines for designers and researchers that he has developed. The approach has had a significant influence not only on the field of software to support learners’ scientific inquiry, but also on the field of learning sciences more broadly, especially in the approach that has become known as ‘design based research.’ Its publication represents a significant achievement and it is noteworthy that Chris is the first author.”

Reviewer G: “His work is attempting to communicate with multiple, diverse stakeholders and in ways that can exert a powerful impact on the design of effective technology-supported learning environments for K-16 educational contexts. On the one hand he is trying to help a broad and eclectic field of ‘designers’ understand issue related to designing educational software to meet the needs of the learner, especially when it comes to helping them grapple with important and complex disciplinary content. … Overall, I am exceedingly impressed by the quality of the work he has done and the scholarly nature of the publications he has produced. Each of the papers I have read is an excellent piece of work and shows grounding in major theoretical and empirical literatures that span science education, psychology, learning science, computer science instructional technology, and instructional design.”

Reviewer H: “It is common for computer science departments to treat CHI publications as top-tier journal articles since they both receive extensive peer review that often rivals similar, journal critiques. Chris has published 5 full papers and 6 extended abstracts at CHI conferences: That would be considered extraordinary for a [junior] scholar in computer science. It’s much more impressive that Chris has been able to publish high quality papers for CHI that deal with educational topics. A few learning sciences researchers have published at CHI (including myself), but he is easily the most successful [junior] scholar to cross the lines between education and computation in this prestigious venue.”
Service: Professor Quintana’s service both within the School of Education and to his broader academic community has been exemplary. He has served as a member of the Educational Studies Executive Committee and also as a member of the ad hoc committee to reorganize the master’s degree program specializations within Educational Studies. The program chair notes that he has made valuable and important contributions in his service roles, thereby making him “an unusually valuable junior faculty member.” In addition, he managed an augmented set of coordination and management tasks with his specialization area last year when the other major faculty member in that area was on leave for the year. In his professional fields, Professor Quintana has provided service that exceeds the norm for an assistant professor, serving on two committees for the International Society of the Learning Sciences (the major international organization in Professor Quintana’s field), as an external advisor to a research project and a national competition, and as a reviewer of journal submissions and conference proposals.

Summary of Recommendation: Christopher Quintana’s scholarship bridges the learning sciences, computer science, human-computer interaction (HCI) and information design. He has effectively developed the idea of “learner-centered design,” and has gained recognition both as a gifted designer of technological learning tools and as a scholar who provides insight into the principles that support effective learning using such tools. At the heart of his work has been a careful probing of the idea of “scaffolding supports.” Professor Quintana’s work is distinguished for the effectiveness with which he has been able to work across the boundaries of different fields and to combine design with theory and empirical research. He has published in ways that meet different norms across the scholarly communities in which he participates, a distinctive accomplishment for someone who has had to move into new fields in the early years of his career. His teaching is effective, and he works skillfully to evaluate its impact and to make improvements as needed; he also has contributed actively to program development. Professor Quintana is a valued member of his program and of the school’s faculty and contributes in ways that others appreciate, both locally and in the profession. I recommend Christopher L. Quintana for promotion to associate professor of education, with tenure, School of Education.

[Signature]
Deborah Loewenberg Ball, Dean
School of Education

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