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# Software Learning Strategies and Perceptions of Rural Individuals

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## Abstract

There are more options today than ever before for learning complex software, ranging from professional courses, to in-application documentation, to community-generated content posted online. While prior HCI research has focused on ways to support software learning, we know little about the experience of rural software users. We are investigating perceptions of software learning strategies of individuals living in both urban and rural communities with the goal of creating more inclusive technologies.

## Author Keywords

Software learning; rural environments; qualitative study.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## Introduction

As more complex software applications become commonly available, so too do the options for learning the software. From structured university courses to user-generated videos, learners have many options to choose from. Common software learning strategies have been studied in the past [11], and findings from this work continue to inform a wide body of research on

novel systems and techniques to improve software learnability (e.g. [3,5,7,8,9]).

In prior work on software learning, one user group that has not yet received attention are individuals living in rural communities. Rural communities are often socially and geographically isolated from resources available in larger urban centres, and continue to face challenges with reliable and fast internet [1], such that can be challenging to access online resources or get in touch with software experts [10]. Together, these issues may lead to unique methods of learning software, which may or may not be supported by current HCI research directions.

The goal of our research is to not only learn of and support workarounds used by rural individuals when learning software, but to understand their perceptions of learning resources, including which approaches they favour and why. We aim to understand what can make technologies inclusive of rural individuals, to narrow the participation divide.

### **Comparing Learning Strategies and Perceptions of Rural and Urban Individuals**

As our first step, we conducted an interview study to compare the software learning practices between those using software in rural as compared to urban settings.

Our study involved 21 participants, nine of whom learned software while living in a rural community. The urban participants reported learning software from communities throughout the world; six while in Canada, eight while in other countries (Malaysia, China, Bangladesh, Nigeria, Brazil). Six of the rural participants learned while in Canada, while two learned

while in China and Nigeria. Participants ranged from 18-45 years old, with the average being 25 years old, nine of them were female, twelve of them male. Participants used a range of software, from productivity, image manipulation and more specialized software.

We asked what strategies participants used to learn software. Although both groups of participants reported similar strategies, we found differences in challenges and perceptions of usefulness.

We found that community-generated content was used by all of our participants, but our rural participants described some of these sources, such as videos, to be too slow to load. If they thought the material would be useful, they would wait the time needed, if not, they would move on. Assessing the suitability of a video for a particular learning goal and stage, however, can be challenging to do before the resource loads.

We were somewhat surprised to hear that when participants had connection issues, they would instead use in-software help, which tends to be more complete and technical. One participant said that although the material was dry, it led to him having a better understanding of the software than if he would have used online documentation.

Beyond connectivity issues, we saw some initial differences in how urban and rural users responded to community-authored resources. Some rural participants hesitated in trusting community-generated content as opposed to manufacturer-designed documentation, while urban individuals did not mention any hint of mistrust towards any sources.

Asking for help from people who are knowledgeable was also common amongst both groups, whether the expert was a course instructor, a professional user, or a friend or family member. All participants mentioned convenience in asking for help from someone in person, however for rural participants, communication tended to be longer-distance, which proved cumbersome when sharing details of their software questions.

As a final note, rural individuals did not mention learning software for hobbies, only for their work. This exemplifies that overcoming challenges to learning software may not be worth the time for rural users when learning software is not for an important task.

### **Supporting Learning Strategies and Perceptions of Rural Individuals**

Our initial interviews provided a starting point in our investigation, but only represent a sparse subset of rural individuals' views on learning software. For ease of recruitment, our call for participation allowed for rural individuals from vastly different contexts (e.g. countries, time periods), so we next aim for a focused participant pool. Although recruiting rural participants is challenging, we also emphasize that our participants need to have a particular characteristic, that they are or recently tried to learn and use feature-rich software, this to get a better sense of usage of learning resources [11]. This is a further obstacle we need to overcome once relationships with rural communities are established.

Through these studies, we aim to understand perspectives of rural individuals learning software, and in doing so, provide opportunities to build inclusive technologies. For example, findings could inform

designs for offline learning resources (e.g. [2,7]), for summarizing video tutorials, that help people gauge trustworthiness of resources or that may even encourage knowledge-sharing (e.g. [4]). These could also benefit those who have poor internet connectivity or those who have challenges expanding their social networks for other reasons than being in a rural area.

### **About the Authors**

Patrick Dubois is a Ph.D. student in Computer Science at the University of Manitoba. His research in HCI involves studying how people share and consume software learning resources, with a particular emphasis among groups which are under-represented, such as rural individuals and women. Patrick grew up in rural Manitoba, and inspired by his experiences, wants to improve technologies to support those with different perceptions and challenges than the majority.

Dr. Andrea Bunt is an Associate Professor in the Department of Computer Science at the University of Manitoba, where she co-directs the HCI lab. Andrea's research falls into the areas of human-computer interaction and intelligent interactive systems, with an emphasis on issues surrounding feature-rich software, community-authored help resources, and computing experiences in rural and remote communities.

### **References**

1. Canadian Radio-Television and Telecommunications Commission (CRTC). 2016. Communications Monitoring Report (CMR). Retrieved February 22<sup>nd</sup> 2017 from <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2016/cmr.pdf>

2. John M. Carroll and Caroline Carrithers. 1984. Training Wheels in a User Interface. In *Communications of the ACM* 27, 8: 800-806.
3. Tao Dong, Mira Dontcheva, Diana Joseph, Karrie Karahalios, Mark W. Newman, and Mark S. Ackerman. 2012. Discovery-based Games for Learning Software. In *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI'12). 2083-2086.
4. Patrick Dubois, Volodymyr Dziubak, and Andrea Bunt. 2017. Tell Me More! Soliciting Reader Contributions to Software Tutorials. In *Proceedings of Graphics Interface* (GI'17).
5. Volodymyr Dziubak, Patrick Dubois, Andrea Bunt, and Michael Terry. 2016. Switter: Supporting Exploration of Software Learning Materials on Social Media. In *Proceedings of the ACM Conference on Designing Interactive Systems* (DIS'16). 1209-1220.
6. Caitlin Kelleher and Randy Pausch. 2005. Stencils-Based Tutorials: Design and Evaluation. In *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI'05). 541-550.
7. Ben Lafreniere, Andrea Bunt, and Michael Terry. 2014. Task-Centric Interfaces for Feature-Rich Software. In *Proceedings of the Australian Computer-Human Interaction Conference on Designing Futures: the Future of Design* (OzCHI'14). 49-58.
8. Wei Li, Tovi Grossman, and George Fitzmaurice. 2012. GamiCAD: A Gamified Tutorial System for First Time AutoCAD Users. In *Proceedings of the ACM Symposium on User Interface Software and Technology* (UIST'12). 103-112.
9. Justin Matejka, Tovi Grossman, and George Fitzmaurice. 2013. Patina: Dynamic Heatmaps for Visualizing Application Usage. In *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI'13). 3227-3236.
10. Roberta M. Melvin, and Andrea Bunt. 2012. Designed for Work, but not from Here: Rural and Remote Perspectives on Networked Technology. In *Proceedings of the ACM Conference on Designing Interactive Systems* (DIS'12). 176-185.
11. John Rieman. 1996. A Field Study of Exploratory Learning Strategies. In *ACM Transactions on Computer-Human Interaction* (TOCHI) 3, 3: 189-218