

## A Brief Look at Online Tutorial Experiences of Older Students in Remedial College Mathematics

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### Abstract

Older adult students in college have many challenges besides their busy home lives and employment situations; often they must also successfully learn remedial college mathematics before they can attempt to conquer their required mathematics courses. During this process, many face fears and anxieties for the subject built up from years of struggles with mathematics. Many colleges are using online tutorials as a resource in these courses to give additional instruction, homework scaffolding and feedback, and to deliver assessments. Yet older students often describe themselves as “old school,” preferring to use bound textbooks instead of online resources. Few studies have investigated the effects of the use of online tutorials for older adults in these courses. This brief qualitative study involves interviews from four older students in remedial college mathematics to hear their side of the issue. Some recommendations are offered as a result of what they had to say.

**Keywords:** Online tutorial, older adults, remedial college mathematics, mathematics anxiety, interviews

In a working adult program at a university in the southeastern U.S., college mathematics courses present a difficult hurdle for some students, especially those that have not been successful in secondary mathematics or previously at college. Some unsuccessfully attempt mathematics courses multiple times (Twigg, 2004), and many develop high levels of mathematics anxiety (Burns, 1998). The adult program at the university has started to require students to purchase, along with their textbook, access to an online tutorial program called MyMathLab (MML). Online tutorials are generally appreciated by students (Demirci, 2010; Lenz, 2010), but have mixed reviews in terms of their effect on student achievement (Kodippili & Senaratne, 2008; Burch & Kuo, 2010). Most studies on this topic, however, have been conducted with traditional aged college students. There is not enough information concerning their use with older adult learners.

The present qualitative research was conducted as a phenomenological study. Interview data from four older students in the university, those recently enrolled in a basic algebra course, were used in the inquiry. This course is a remedial course required by students before they take the mathematics course required by their major. The students used MML at various levels of involvement, since the program was only used on a required basis for two quizzes. Students had the option of either doing homework online in MML or on paper from the textbook.

### Conceptual Framework

Phenomenology is a method of qualitative research that seeks to understand the nature of an experience shared by several people (Creswell, 2007). One brand of this approach is espoused by Moustakas (1994) and is called empirical or transcendental phenomenology. This method places less emphasis on the interpretations of the researcher and more emphasis on a description of the experiences of the participants. Bracketing, in which a researcher seeks to describe and then set aside his own perspectives on a situation, is a key component in this process. After identifying a phenomenon to be studied and bracketing out one's own views, the researcher collects data from several persons who have experienced the phenomenon. The data is analyzed by reducing the information to the most important statements and combining these using overarching themes. Finally, the researcher develops a textual

and a structural description of the phenomenon in order to represent the overall nature of the experience for the participants.

### Bracketing of the Researcher's Perspective

The researcher has a post-positive viewpoint and overall pragmatic approach to inquiry. In a six year experience with adult learners in remedial college mathematics courses, the researcher has taught the basic algebra course over 20 times to at least 300 students. Experience indicates that successfully teaching remedial mathematics to adult learners is especially difficult. Often these students have been out of the academic scene for decades. Teaching a content laden course like algebra requires intensive immersion into the material. Their busy lives full of complex family relationships, responsibilities, or other distractions make this a special challenge.

Working with adult students has given the researcher insight into their fears and concerns regarding mathematics and their level of comfort with technology. Students with mathematics anxiety often drop the course to avoid the psychological pain of facing failure. Sometimes they become physically sick or at least emotionally upset at having to face an assessment in algebra. Also, although the majority of older adult students adequately adjust to technological demands of college work, some still find computer technology intimidating.

### Sampling and Data Collection Procedures

Questionnaires were used to collect responses about student experiences with the online tutorial, specifically in regards to how much it was used, issues with its use, and how helpful the tutorial was. The questions used for the survey and as guiding questions in the interviews are shown in Table 1. Interviews were conducted with certain students whom the researcher felt were representative of the students as a whole, and who were willing to be interviewed. Interviews were performed after the students had finished the course and had used the program. An empty classroom in the regional center at which they had class was used to hold the interviews. The interviews took between 20 and 40 minutes and were audio taped in order to later transcribe the conversations. The four students for this study will be identified with the pseudo names Marge (age 40), Mildred (age 47), Mark (age 40), and Penelope (age 55).

Table 1. *Questions used for the survey and as guiding questions in the interviews.*

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#### Questionnaire

1. *How would you describe your level of anxiety about mathematics? Explain*
  2. *Is there anyone among your family or friends that can help you with mathematics? Explain.*
  3. *How do you feel about using the MyMathLab program? Explain.*
  4. *Did others help with using the MyMathLab program? If so, how did they help you? Explain.*
  5. *How easy is it to use the MyMathLab program? Explain.*
  6. *How much total time did you use MyMathLab for learning mathematics (the tutorial)?*
  7. *How much total time did you use MyMathLab for taking the online quizzes?*
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### Coding and Data Analysis

Transcript data was read multiple times, and then coded and analyzed for overall themes. These themes developed into the following list: (a) mathematics anxiety, (b) computer anxiety, (c) difficulties with MML, (d) issues with taking quizzes in MML, and (e) time involvement with MML. Statements were categorized into these areas. Conclusions were made in a straightforward manner from participant responses. Member checking, having participants read and verify the statements they made as recorded in the interview transcriptions, was performed to ensure the accuracy of any conclusions made concerning the meaning of qualitative data. Reliability was increased by the use of an audio recorder for interview data (Creswell, 2007).

## Results

Mathematics anxiety, a concern in part caused by student failures from the past, is intense with some of the students in the study. Two of the four students (Mildred and Penelope) in the study failed the basic algebra class offered at the college at least once. One of the participants (Marge) described her feeling toward mathematics as being “comfortable” with the subject, but for the other three participants, statements indicated discomfort with mathematics. Penelope had “a little anxiety” and found mathematics to be “frustrating.” Penelope also said “I guess I get anxious because I think I get it and then don’t” and that mathematics was “overwhelming for me.” She gave as a reason for this that it had been many years since she had mathematics. Mildred also claimed a “lot of anxiety about mathematics” and that it was “very complicated to me...Mathematics took up so much of my time it was like a second job.” Mildred tended to blame her own lack of ability in mathematics, saying she was “very mathematics challenged” rather than to say that outside factors were the cause of her difficulties. Mark said that he would have in the past described his level of mathematics anxiety, on a scale of one to ten, to be a ten. Then, however, he related how he had faced his “demons.” His success in two different mathematics classes (the previous remedial class and a recently completed basic algebra class) had reduced that level down a bit, although the anxiety was still present. He had described the experience of entering a mathematics class as follows: “...you’re scared enough being there, especially mathematics, and if the teacher scares you, that’s double jeopardy, in my eyes, and then you’re running, screaming home...” But then he said he studied and progressed to the point that “it didn’t seem that bad,” although he compared it to learning a different language.

Computer anxiety was not generally a problem with these students, although there were some minor issues. Marge had no concerns with using technology. Some said that they had progressed in their computer skills and confidence to a point that they were moderate (Mildred) or “mediocre” (Mark) since they had been in college a few years already and *had* to learn these skills. Mark tended to blame his lack of skills rather than the MML program for not being able to navigate in the program or not knowing all of its features. Mark said he was “old school” and preferred books to online learning. Penelope just had a problem with sitting for long periods of time in front of a computer.

Some of the participants had difficulties or found inadequacies using the MML program. Penelope said that she and some of her classmates had trouble logging into the program. Marge said that two of the chapters of the content section of the program were missing, while her classmates had those sections. Marge also had forgotten to take the quiz for her class, something she would not have done had the teacher given her the quiz in class as in a traditional setting. She was also worried that she would not know how to enter the answers into MML when she took a quiz. Mark was concerned about navigating in the program and not being aware of the features of the program – he wanted a guidebook for the program.

The major issue, expressed by three participants of the four, was that the program could not give them answers to their specific questions – it could only show a few steps to do the problems. Mildred said that “when I got stuck, I wasn’t able to ask specific questions and was not able to come up with how they came up with the answer they were giving me...If you understand the problems, it is very good to practice, if you understand what you are doing...But once it got a bit more difficult I couldn’t relate to what *MyMathLab* was doing.” Mark used the videos to try to answer some of his questions about how to solve equations, but was frustrated because he could not figure out how to progress the video to the “meat and nitty gritty of where I was stuck” on a problem so that he could learn an answer to a specific question he had.

Some participants also expressed issues with taking the course quizzes online in MML. Since two attempts were offered for taking each quiz, one student (Penelope) developed a strategy for taking the quizzes: she would half-heartedly take the online quiz for the first time, printing out or writing down the questions on the quiz. Then she would carefully work out answers to the quiz problems taking a much longer amount of time than the quiz allows, not caring if she scored a low grade. Then she would attempt the quiz “for real,” using her worked out problems from the extended study as a resource. Mildred had an even more “creative” approach to taking online quizzes: she took the quiz the first time, doing poorly on it, and then she would enlist the help of another person to help her take it the second time! Her comment about this indiscretion was “for me and mathematics, I had to have help.” On the other hand, Mildred did comment that she felt that taking quizzes in class was better than taking quizzes online. Mark’s viewpoint

about quizzes was that “the online quizzes were too unforgiving.” What he meant by this was that the “setup was kind of confusing at first since it was unclear what part of the answer the program was wanting him to enter. “Yes, that’s what I mean by unforgiving. It can’t reason – it can only go by the format of what it is supposed to.”

Lastly, participants said that they spent large amounts of time using the program per day. Marge used the program two or three hours per day. Mildred used the program four to five hours a day at the beginning, only diminishing this amount when she felt that the program was not helping her all that much. Penelope used the program two or three hours per day. For working adults many of whom have families to care for, this may be an excessive amount of time. Mark used the program only about twelve hours total during the course, ten of those for taking the online quizzes, but perhaps this was a result of him preferring books to online learning.

## Discussion

In our efforts to help older adult learners in mathematics courses, we need to pay attention to what these students are saying about the online tutorial programs we have them use. Many students do find these types of programs helpful as a result of the timely feedback and “24-7” availability they offer. Lenz (2010) studied the effect of a web-based homework system on student achievement for students in a first-year mathematics course and found that students were more likely to attempt homework and received higher grades with web-based homework compared to paper-based homework. However, for older adult learners, there may be a few issues that do not generally occur among traditional aged college students. Li and Edmonds (2005) found that at-risk adult learners realized benefits with an online tutorial but encountered some navigation issues and confusion with the format, examples, and objectives of the online material. This study, perhaps, continues to inform those in adult education about issues with such programs and how older students view one particular online tutorial program.

Online tutorial programs for mathematics should be sensitive to students with various levels of mathematics anxiety, as some students mentioned in this study experience. Tutorials should carefully break down material into easily understandable segments using multiple presentation modes and should be user-friendly and easy for one to navigate. For educators, piloting an online tutorial before its adoption is suggested. During the pilot study, interviews and data collection procedures to gather both qualitative and quantitative results should be conducted. Finally, since scant research on these programs and older adults exists, further investigative work on the effects and usefulness of online tutorials for older learners is needed.

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