



ABOUT THE STUDY

Using a systematic literature review, I identified why mathematics teachers decide to implement a change in their teaching practice. I analyzed 11 peer-reviewed articles using expectancy-value theory. The research question was what reasons are implicitly or explicitly given in the research literature for what motivates secondary mathematics teachers to change their teaching practice?

FRAMEWORK

- I considered change in teaching practice as any reform, reconstruction, adaptation, or introduction of new or different elements to the instruction done by the teacher.
- I considered expectancy-value theory (E-V) that states that subjects' choice and performances can be explained by their beliefs about how well they will do the activity and the value they assigned to it (Wigfield & Eccles, 2000).
- The subjective task value is determined by the task's characteristics and its capability of fulfilling needs, reaching goals, or affirming personal values (Eccles, 1983). It has four components (Eccles, 1983; Wigfield & Eccles, 2000):
 - Attainment value* refers to the importance of doing well on or participating in the task.
 - Intrinsic and interest value* refers to an inherent enjoyment of doing the task.
 - Utility value* corresponds to the importance of the task for personal's goals including to reach some desired state.
 - Cost* refers to what the person has to give up when he/she engages in the task.

METHODS (PART 1)

I searched for articles that reported reasons or motivations for change in mathematics teaching practices.

- I excluded papers that focused on a shift in mathematics education in general or in any educational system. I also excluded studies of preservice math teachers.
- To analyze the 11 selected articles, I started by reading each piece carefully in Mendeley and open coding through notes. Specifically, I wrote phrases that gave me an initial idea about the motivation identified in the document's portion that I highlighted. Once I did the first cycle of coding, I created a spreadsheet file.
- Each tab in the file contained a sheet that includes part of the reference, a brief description of what the article was about, the changes reported in the article, the motivations identified, and some comments in case I needed to keep in mind something additional.

METHODS (PART 2)

- The systematization of initial motivations allowed me to create another sheet where I included all identified motivations and the articles from where they came from.
- I created themes or patterns of the motivations by identifying commonalities between all the motivations listed. After peer debriefing, my final themes are the following:

E-V component	Motivations
Expectancy of Success	Success in previous experiences
	Advice from the education community
Subjective Task Value	A perception or response to evaluative practices
	Improving students' learning of mathematics
	Increasing student engagement
	Strengthening students' good feelings toward mathematics
	Awareness of the richness of a resource
	Teacher's dissatisfaction with their teaching
	Policies

FINDINGS (PART 1)

I found nine reasons (see table above) about why math teachers decided to implement any change in their teaching practices. They are related to what teachers expect or value from the implementation of change.

Following I will briefly describe some of the main findings.

- As a change's value, teachers expect to develop more profound understanding of mathematics in their students, increase engaged students, and strengthen students' good feelings toward math.
- Here is an example assuming the reason "strengthening students' good feelings toward math".
 - Widjaja et al., (2017) present a teacher's explanation that he started giving his students 15 minutes at the end of the lesson for sharing their work because during that time, students reflected with others. Thus, the math class become a kinder space that allow sharing with peers while learning takes place.
 - Brown (2017) identified that teachers implemented technology with the hope that students enjoyed mathematics.
 - de Araujo et al. (2017) stated that teachers applied flipped classrooms with the hope that students gain more positive attitudes toward mathematics.
 - Teachers from Turner et al. (2011) implemented grouping activities and shifted roles in the classrooms encouraging students to participate actively, because they wanted their students to feel competent in mathematics, as well as more powerful through autonomy and belongingness in the class.
- In the four cases, the motivation refers to the change's value since teachers believe introducing the change will result in a stronger relationship between the students and mathematics.
- Teachers seek to increase students' positive feelings by affecting their motivation. In the papers, teachers looked to increase the value of the math class, focusing on increasing its intrinsic value (through enjoyment), filling psychological needs (competence, autonomy, and belongingness), or incrementing the utility value (taking advantage of the content in the future).

FINDINGS (PART 2)

- Success in previous experiences and advice from the education community are reasons associated with the expectancy of success. In the first case, mastery or vicarious experiences nourish self-efficacy. In the second, the persuasion from a fellow or some entity recognized by the teacher as credible, increase their perceptions of success in class.

DISCUSSION

Different reports analyzed change of mathematics teaching practice as an implementation of a national or regional reform (e.g., Boesen et al., 2014). Plenty of papers report changes in math teaching practices as consequences of some change approach or as part of a professional development project; however, few were found about mathematics teachers' reasons that motivate them to encourage change in their teaching. This study provides an initial point to unravel aspects that affect one of the essential parts of change, the individual involved (Boesen et al., 2014; Brown, 2017). Three reasons align with three elements of students' academic motivation proposed by Jones (2018): students' motivation, students' engagement, and learning. That means that teachers' reasons for changing their teaching practices are associated with students' academic motivation configured from the relationships that occur within it. Thus, a proposal that pursues change in teaching practices must consider the increase of students' academic motivation as an outcome since teachers will expect that their change lead to a deeper understanding of mathematics, to get engaged students, and to boost students' motivation. Also, there was not any reason associated to intrinsic value, which means that teachers do not enroll due to interest in the change itself.

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