



HOW DOES VARYING THE LEVEL OF CHOICE IN MATHEMATICS HOMEWORK AFFECT ACHIEVEMENT OR MOTIVATION?

ABSTRACT

The purpose of our research was to find a baseline that could be compared to a varying level of choice in mathematics homework and the current level of choice to achievement and motivation (based on self-determination theory and flow theory) and then finding how the level of choice affects the level of achievement in later studies. By asking students to fill out a survey and gathering homework grades, we were able to correlate different characteristics of motivation and flow among each other and with the homework grades. The homework style was changed to offer more choice to the students, and we analyzed to see if there was any difference compared to the “normal” homework style. From this, we found many significant correlations that we could use to move forward.

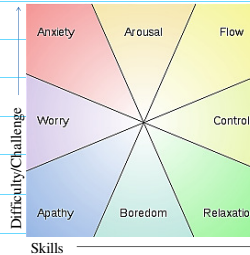
BACKGROUND INFORMATION

Self-determination is a theory proposed by Edward Ryan and Richard Deci and is the ability to make things happen, to have control of ourselves and our environment.

- ✓ Autonomy is the sense that a person has choices and is making those.
- ✓ Competence is the desire of an individual to achieve mastery in a certain domain.
- ✓ Relatedness is either how the task relates to the individual’s goal or how an individual works with others.
- ✓ Extrinsic motivation is the motivation that comes from outside the individual, such as approval of others, meeting others’ goals, and performing behaviors valued by the group.
- ✓ Intrinsic motivation is the motivation that comes from within the individual and can take the form of personal energy, drive, or ambition.

Flow theory is the theory proposed by Mihaly Csikszentmihalyi and states that individuals can be in a state of flow when the task is neither too difficult nor too easy; it is based on the mastery or skill level of an individual.

The chart on the right shows the different feelings felt by individuals based on their skills and the challenge.



RESULTS

The variables that were tracked were confidence, other, challenge, skills, control, effort, and importance as well as time, who helped, what else was the student doing, why was the homework assigned, and grades. The following are the significant correlations of confidence, other, challenge, skills, control, effort, and importance as a whole (not separated by homework choice). Effort and other could not be pooled.

- ✓ Skills and control were significantly correlated, $r = 0.755, p < 0.05$.
- ✓ Confidence and skills were significantly correlated, $r = 0.732, p < 0.05$.
- ✓ Control and effort (teacher one) were significantly correlated, $r = 0.507, p < 0.05$.
- ✓ Control and effort (teacher two) were significantly correlated, $r = 0.321, p < 0.05$.
- ✓ Skills and effort (teacher one) were significantly correlated, $r = 0.458, p < 0.05$.
- ✓ Skills and effort (teacher two) were significantly correlated, $r = 0.246, p < 0.05$.
- ✓ Confidence and effort (teacher one) were significantly correlated, $r = 0.429, p < 0.05$.
- ✓ Confidence and effort (teacher two) were significantly correlated, $r = 0.233, p < 0.05$.
- ✓ Effort and importance (teacher one) were significantly correlated, $r = 0.293, p < 0.05$.
- ✓ Effort and importance (teacher two) were significantly correlated, $r = 0.357, p < 0.05$.
- ✓ Importance and time were significantly correlated, $r = 0.257, p < 0.05$.
- ✓ Challenge and skills were significantly correlated, $r = -0.376, p < 0.05$.
- ✓ Confidence and challenge were significantly correlated, $r = -0.390, p < 0.05$.
- ✓ Challenge and control were significantly correlated, $r = -0.391, p < 0.05$.

	Confidence	Other	Challenge	Skills	Control	Effort	Importance
Regular	3.75	3.44	2.54	3.66	3.53	3.58	3.26
Pick Four	4.04	3.43	2.52	3.77	3.70	3.75	3.07
Pick Five	3.81	3.00	2.67	3.60	3.57	3.81	3.57

The ANOVA shows no significance for all variables among the different homework choices, $p < .05$.

CONCLUSION

The correlations confirmed what we initially hypothesized would happen. It makes sense that if students feel more confident they will experience less challenges, have more skills and control, and give more effort. It was interesting that effort could not be pooled. However, since there was no significance among the three homework styles using an ANOVA, we cannot say that varying choice in homework will affect motivation or achievement.

FUTURE RESEARCH

There needs to be some changes in an experiment dealing with teachers, students, and a survey. Some questions, such as the time spent on assignment, needs to be changed to include more times rather than fifteen-minute increments. Further, stress the importance of having the surveys done at the same time, preferably after the student completes the assignment. Finally, more data is never a bad thing.

Exploring different homework styles currently implemented by teachers. This method would not require a teacher to change his or her style except to have the students fill the survey out after completing their homework assignment. To check for teacher variation, analyze two similar homework patterns together.

METHODS

This survey was filled out by the students following the assignment. One teacher had the students fill the survey at the beginning of the next class. The other teacher’s students filled the survey after finishing the homework in class. The surveys were taken over a period of two to six weeks. We analyzed our results using the Predictive Analysis SoftWare (PASW).

REFERENCES

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