

EXPERIENCE-BASED LEARNING AND ACADEMIC MOTIVATION OF SENIOR HIGH SCHOOL STUDENTS

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Abstract

The study aimed to determine the relationship between experience-based learning and academic motivation of senior high school students. This study employed the non-experimental quantitative research method utilizing descriptive-correlational technique. Descriptive survey was used to describe the experience-based learning and academic motivation of the respondents. Correlational technique was used to examine if there is a significant relationship between the students' experience-based learning and their academic motivation. The respondents of the study were 237 Senior High School students of Central Mindanao Colleges officially enrolled for the first semester, school year 2018-2019. The sample size was determined through Slovin Formula. Mean and Pearson r were used to analyze the data. Results disclosed that the experience-based learning is described as high. Similar finding on the level of academic motivation registered as high. Importantly, results revealed that academic motivation is significantly related to academic motivation.

Keywords: education, experiential-based learning, academic motivation, correlational

INTRODUCTION

Lack of motivation during the teaching learning process may affect the student's performance. Since the early 1970s, there has been a sustained research that focused on how students' motivation greatly influences learning and classroom performance

(Linnenbrink & Pintrich, 2002). Many psychologists and educators have long considered students' motivation as an important factor of successful learning (Mustafa, Elias, Noah & Roslan, 2010). However, lack of motivation still constitutes a serious problem both for teachers and students in language classrooms. Hence, teachers' negative attitude towards students and non-supportive classroom environments damage students' willingness towards lesson. Shortage of positive reinforcements, approval and appreciation of students by teachers influences motivation to learn negatively, (Timmins, 1999).

In the teaching-learning process, experiential learning plays a significant role. Kolb's Experiential Learning Theory (Kolb, 1984) defines experiential learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience. It is a powerful teaching tool. While classroom lectures primarily address the cognitive domain, experiential learning involves the whole student: their cognitive, affective and physical domains (Oxendine, Robinson and Willson, 2004). The result is that students can relate to the subject matter in a way that is meaningful to their own lives. Experience-based projects offer a change of pace from traditional classroom assignments and facilitate learning for students with a variety of learning styles (Millenbah et al, 2004).

An in-depth research of the variables of this study was conducted to see the connections to each other that will lead to the purpose of the conduct of the study. One independent variable (IV) and one dependent variable (DV) are covered in this study. The independent variable is Experience – based learning. As defined by (Kolb and Kolb, 2011), it is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transformation of experience. On the other hand, the dependent variable of this study is Academic motivation. As cited by Frymier (1970), motivation towards school or academic motivation is an inferred construct, which gives both direction and intensity to human behavior and its motive, which relates human behavior to learning in an academic setting.

It is the intention of the study to contribute to the ongoing discussion about the Experience – based learning by showing that they have a direct impact on Academic motivation of the Senior high school students. More specifically, this study deals with exploring the role between experience-based learning – academic motivation relationships. Experience – based learning is included because

previous researches demonstrated that this has a great impact on students' motivation in learning. However, some previous research did not uncover the process of relationship between experience-based learning and academic motivation. This study is designed to fill this gap by proving the relationship between experience – based learning and academic motivation. Importantly, this research has social value which could be gauged by teachers to fully adapt the used of experiential learning- academic motivation in the learning environment.

METHOD

This study employed the non-experimental quantitative research method utilizing descriptive-correlational technique. Descriptive survey was used to describe the experience-based learning and academic motivation of the respondents. Correlational technique was used to examine if there is a significant relationship between the students' experience-based learning and their academic motivation. The respondents of the study were 237 Senior High School students of Central Mindanao Colleges officially enrolled for the first semester, school year 2018-2019. The sample size was determined through Slovin Formula. Sample respondents were selected using simple random sampling. The study utilized statistical tools for analysis of the data. Mean was used to describe the level of experiential-based learning and academic motivation. Pearson Moment Correlation Coefficient was utilized to analyse the significant relationship between the experiential – based learning and academic motivation.

RESULTS AND DISCUSSION

Socio- economic Profile of the Respondents

Table 1 discusses the socio-economic profile of the respondents in terms of gender and age. Majority of the respondents were female with (61.3%) and 38.7% were male. Most of them were in the age bracket of 17-18 years old with 58.7 %. It is followed by the age bracket of 16-17 years old with 33.3 % and 18-19 years old with 8.0%.

Table 1
Profile of the Respondents

	Frequency	Percentage
Gender		
Male	58	38.7
Female	92	61.3
Total	150	100
Age		
16-17	50	33.3
17-18	88	58.7
18-19	12	8.0
19 & above	0	0.0
Total	150	100

Level of Experience – based Learning

As shown in Table 2, it could be noted that the overall mean score is 3.89 and the standard deviation is .489 with the description of High. Indicator Reflective Observation obtained that highest mean of 3.95 with standard deviation of .557 with the description of High. Abstract Conceptualization follows with the mean score of 3.94 and standard deviation of .570. Similarly, Active Experimentation obtained 3.94 and standard deviation of .5674 with the description of High. Lastly, Concrete Experience accumulated the lowest mean score of 3.730 and standard deviation of .45989 with descriptive equivalent of High.

Table 2
Level of experience – based Learning

Indicators	Mean	Std. Deviation	Interpretation
Concrete Experience	3.73	.4598	High
Reflective Observation	3.95	.557	High
Abstract Conceptualization	3.94	.570	High
Active Experimentation	3.94	.567	High
Overall Mean Score	3.89	.489	High

The overall result of High indicates that Experience – based Learning is oftentimes practiced by the respondents. This implies that respondents believe that experience is an important tool in the future because it offers them a lot of life lessons and gives value to other's experiences. Also, respondents give high regards to

Experiential learning for it help them relate theory to practice and analyze real-life situations in light of course material.

The results show that indicator Reflective Observation registered the highest mean score because the respondents give high regards on how they engage themselves to the learning activities in school which provide them the chance to develop their potential. In addition, they use impartial and careful evaluation to see implications and connections, appreciate different points of view, and look for the meaning of things. Experiential learning techniques involve time for the learner to reflect on the experience to gain full understanding of the information. This is anchored to (Humphrey, 2009) study that reflection can be defined as "the activity which takes place in our own minds when we stand back from the first-order phenomena in everyday life and process these raw experiences from a distance, inviting second-order processes to come into play". Reflection is a highly personal and subjective activity, as such, students may interpret the form of their reflection in many different ways. It is thus helpful to have a well described process for what is required in a reflection.

The indicator Abstract Conceptualization registered the second to the highest mean score. It is because the respondents use logic and ideas as opposed to feelings to understand situations and problems. It has been said that respondents resolved the conflict by choosing. Because of their hereditary equipment, their particular past life experiences, and the demands of our present environment, they develop a preferred way of choosing. Respondents resolve the conflict between concrete or abstract and between active or reflective in some patterned, characteristic ways. This result is supported by Ultanr (2012) that individuals create or construct a new understanding or knowledge through the interaction of what they already believe and the ideas, events and activities with which they come into contact with. In addition, (c) learning requires the resolution of conflicts between dialectally opposed modes of adaptation to the world.

Indicator Active Experimentation registered the second to the lowest mean score. Results reveal that the respondents frequently observed that they discover new things to learn while studying. In addition, they based their idea on interpretation out from their experience. They learn through self-exploration and discovery, trial and error, outdoor exposure and enjoy learning by doing it. In doing so, the respondents use theories to make decisions and solve problems. This is congruent to the statement of (Hein & Budny,

2003) indicating that active learners tend to retain and understand information best through participating in discussions, applying what they have learned or explaining it to others. These people welcome practical applications rather than reflective understanding as well as actively participating rather than observing. This is also anchored to Barmeyer, 2004; Kolb and Kolb, 2005 argument that learners like to try things out, are more willing to take risks and are practical and application oriented. This learner perceives information by doing something with it. They have the ability to get things done, take risks and influence people and events through action. (Contra Costa College Glossary & Felder, R.M., Solomon).

The indicator Concrete Experience registered the lowest mean score. This implies that students give more value to reflective observation for it mirrors them to learn out from their experiences rather than concrete experiences. This finding is supported by Lewis & Williams (1994) that experiential learning helps students relate theory to practice and analyze real-life situations in light of course material. Additionally, students can process real-life scenarios, experiment with new behaviors, and receive feedback in a safe environment. This implies that in experiential learning, the learner is the self-teacher, therefore there must be "meaning for the student in the learning." The learning activities must be personally relevant to the student (Chapman et al.) They should also admire the uniqueness and complexity of reality, perhaps noting an absence of structure, and employ an intuitive, artistic approach to the situation with sensitivity to personal feelings and other people. Ideally, the student is involved fully and openly in the new situation (Kolb, 1984). The result of Experience-based learning supports the findings of the study of Jeffrey J. Selingo (2016) that 79% of the most successful college graduates had at least one college internship as well as other out of the classroom projects that falls to co-curricular experiential education programs. This is done to add direct experience component to their traditional academic studies. Also, the study of Kolb's (1976) LSI have shown some measure of agreement about clusters of disciplines based on the learning experiences predominant among their students (Kolb 1994). More agreement is apparent if disciplines are subsumed under descriptions such as social sciences or humanities (Willcoxson and Prosser 1996). Finally, the study of Dewey (1933) stressed out the dynamic nature of pure experiencing in the learning cycle, noting that ordinary experience is conservative, tradition-bound, and prone to conformity and dogmatism, being culturally mediated by many previous trips around the learning cycle and saturated with previous conclusions. Moreover, he emphasized that this conservative experience must

be interrupted to initiate reflection and learning.

Furthermore, he argued that it was necessary to reflect on experience in order to draw out the meaning in it and to use that meaning as a guide in future experiences; but he observed that the reflective process seemed to be initiated only by pure experiences that break out of conservative experiencing, such as when we are “stuck” with a problem or difficulty or “struck” by the strangeness of something outside of our usual experience. Level of Students' Academic Motivation

As presented in Table 3, it could be gleaned that the overall mean score of the Academic Motivation accumulated 3.94 and standard deviation of .498 with the description of High. Indicator Mastery of Goals registered the highest mean score of 4.08 and standard deviation of 6.08 with description of High. It was followed by the indicator Need for Achievement with the mean score of 4.07 and standard deviation of .622 with the equivalent description of High. Moreover, Authority Expectations obtained the mean score of 3.92 and the standard deviation of .652 with the equivalent description of High. Sequentially, Power Motivation obtained the mean score of 3.913 and the standard deviation of .620 with the same equivalent description of High and Peer Acceptance has registered the mean score of 3.85 and the standard deviation is .763 with the description of High. Finally, indicator Fear of Failure got the lowest mean score of 3.83 and the standard deviation is .649 with the equivalent description of High.

Table 3
Level of Students' Academic Motivation

Indicators	Mean	Std. Deviation	Interpretation
Mastery of Goals	4.08	.608	High
Need for Achievement	4.07	.622	High
Authority Expectations	3.92	.652	High
Fear of Failure	3.83	.649	High
Peer Acceptance	3.85	.763	High
Power Motivation	3.91	.620	High
Overall Mean Score	3.946	.4893	High

It could be noted that the level of Academic Motivation was described as High. This means that the respondents are highly motivated for they have established their capability of reaching their academic goals. Also, it provides them an account of human motivation and self-regulation learning. Furthermore, respondents have established a drive to pursue an activity simply for the satisfaction or pleasure derived from it and pursuing an activity out of a sense of obligation or a means to an end. The indicator Mastery of Goals registered the high in descriptive level. This means that the respondents are highly self-motivated in valuing knowledge and academic learning experiences they get in junior high school and they highly acknowledge the learning they get in the class. Furthermore, the results show that the students have high level of intrinsic motivation in most indicators of mastery of goals. These imply that the students are highly motivated for they have established their capability of reaching their academic goals. They have the so-called "personal desire" to have growth in terms of performing in school.

The study of Harter (1981) portrayed intrinsic motivation as an inquisitiveness or an interesting activity which guide learners to search for the activities which seemed difficult but wanted to master them with enjoyment. According to him, intrinsic motivation have three mechanisms namely, challenge, interest and self-regulating mastery. It was sustained that intrinsically motivated learners that do not rely on teachers rather they were expected to prefer innovative and challenging tasks, they were inclined to learn new and complicated tasks, work out immense autonomy on learning. This conforms to the study of Girod (2012) which concluded that learners with high level of mastery of goals develop competence over time through practice and effort. They were more likely to be enthusiastic about school and become actively involved in academic activities.

The indicator Need for Achievement registered high academic motivation in terms of setting and meeting high standards of achievement. The students are highly motivated to learn everything they need to learn. In addition, the students are highly motivated to do their best in every task such as project making and other academic performances. The study of Clint (2012) supports the above results. It claims that students with high need for achievement have a desire for significant accomplishment, mastering skills, control or high standards. This is associated with the ranges of actions which include intense, prolonged and repeated efforts to accomplish something difficult and to have the determination to pass.

Indicators Authority Expectations, Fear of Failure, Peer Acceptance and Power Motivation are regarded as High under Extrinsic Motivation. Extrinsically motivated students participate in an activity for its potential to help them earn a good grade, please a teacher, or obtain the respect of peers. Guthrie and Humenick (2004) maintained that students who depend upon teachers, peers, or methods other than themselves to provide the benefits of reading are considered to be extrinsically motivated because these sources are all considered to be external in nature. This is supported by the study of Becker, et al. (2010) that early reading failure leads to higher extrinsic motivation, with children reading only when they have to, which in turn leads to poorer reading skills....children who read for extrinsic reasons have poorer reading skills than children with lower extrinsic motivation.

Similarly, the study of Deci et al. (1991); Dev (1997); Fortier, Vallerand, & Guay (1995); Vallerand et al. (1992); and Schraw et al (1995) indicated that students are also using extrinsic motivation that is particularly based on fear of failure and authority expectation. Moreover, results indicate that females are significantly more extrinsically oriented than male students. Although the literature suggest that girls are often found to have higher level of persistence, self-regulation, cognitive engagement, mastery orientation, and planning and management than their male counterparts (Brouse et al., 2010; Garvin & Martin, 1999; Vallerand & Bissonnette, 1992; Vallerand et al., 1992; Wintre & Yaffe, 2000). Some research used Harter's (1981) children's Self -report Scale of Intrinsic versus Extrinsic Motivation, have found that sixth grade female students were significantly more extrinsically motivated than male students (e.g. Boggiano, Main, and Katz 1991).

The result of Academic Motivation is congruent to the study of McClelland, Atkinson, Clark & Lowell (1953); Entwistle (1968); Frymieret. Al (1975); Pintrich & Shrunck, (2002); Woolfolk, (2004) that academic motivation is identified as the most influential factor that affects the academic performance, academic achievement and the "will to learn". Similarly, the results in the study are consistent with the study of Pintrich & De Groot, (1990), Wigfield & Eccles, (1992) which reveals that when students have an interest in the task, when they see its importance and value, this will predict their success. Research in this area has pointed out that students' motivation predicts both the quality of engagement in school learning and the degree to which students seek out or avoid challenging situations. Further, the study of Brown (2009) emphasized positive academic motivation has the desire to learn, like learning-related activities, and

believes that studying is important. Positive academic motivation does not only help students to succeed at a university, but also helps them in seeing that learning is rewarding and important in all aspects of life. Lastly, the study of Lee (2010) revealed that academic motivation played a major role in the students' academic work. It is reflected in the students' choices of learning tasks, in the time and effort they devote to them, in their persistence on learning tasks and in their coping with the obstacles they encounter in the learning outcomes.

Correlation Analysis Experience – based Learning and Academic Motivation

The Pearson r of .759 with the P-value of .000 is less than at .05 level. The result indicates the significant relationship between Experience – based Learning and Academic Motivation. Hence, the null hypothesis is rejected.

*Table 4
Correlation analysis between Experience – based Learning and Academic Motivation*

	Experience-Based Learning			
	Pearson r	P-value	Significance	Decision
Academic Motivation	.759	.000	Significant	Reject H ₀

*Significant at .05 level

The result of significant relationship between Experience – based Learning and Academic Motivation is supported by the findings of the study of Flowerday and Schraw (2000 cited in Brophy, 2010) that there has been a great impact of Hands-on Experiments on students' motivation in learning. Previous researches revealed that teachers believed that a choice of learning strategies especially hands-on-experiment will increase the interest, engagement and learning of students. It also mentioned that students who did not show much motivation towards school activities at first experienced a stronger impact from the implementation of various learning strategies. In line with this, the researchers found quite a number of positive responses from the students in this research involving hands-on experiments which incorporated Kolb's experiential theory in the lesson.

Also, the finding relates to the study of Brophy (2010), as students enjoy learning and build their interest in learning, it will lead them to be active participants in class. In addition to, hands-on experiments motivated students to take further actions such as doing extra reading and conducting experiments at home. Moreover,

it could be noted that most children are intrinsically motivated to learn about the natural world, particularly when learning involve hands-on experiences and is perceived as relevant and can be made meaningful (Carin & Bass, 2001).

The study of Deci and Ryan, as cited in Gurland and Glowacky (2011) proves people who appear to be equally motivated to engage in an activity can differ in how they experience the performance of that activity. They explained that some individuals may perform an activity with a genuine sense of wanting to do it. These individuals, they posited, may engage in that activity because it is interesting and enjoyable for its own sake. Such individuals, according to Deci and Ryan, see that activity as personally important to them. Other individuals by contrast, may engage in an activity with a sense of externally or internally imposed coercion. These individuals may perform an activity for the sake of rewards, consequences, or other outside contingencies. On this account, motivation is indexed not by whether individuals engage in an activity or not, but rather by how much they experience the activity as interesting, enjoyable or personally valuable versus as pressured or coerced (Gurland & Glowacky, 2011).

Similarly, the study of Trna, (2005) proved that simple experiments give the strongest motivational effect on the learners. Pedagogical research based-on teaching methods are necessary for the use of simple experiments in every day school practice with a high level of motivational effectiveness. Simple experiments are the source of strong motivation because they can activate cognitive needs such as problem solving, but can also satisfy the needs of our senses and kinesthetic activity. Simultaneous activation of two or more cognitive needs can result in a strong motivational impact. Simple experiments are profitable in education, because they do not require complex and expensive equipment and students can perform them in class and at home. From the pedagogical constructivist point of view it is important to select appropriate physics school experiments. We developed a typology of simple experiments conducive to the implementation in cognitive motivational teaching techniques.

CONCLUSION

Based from the findings of the study, it could be concluded that the level of experience- based learning was described as High. This indicates that the respondents are learning through experiences and apply it in their daily life experiences. They discover new things

to learn while studying and are capable of reflecting what they have learned from it. In addition, they based their idea on interpretation out from their experience. They learn through self-exploration and discovery, trial and error, outdoor exposure and enjoy learning by doing it. In doing so, the respondents use theories to make decisions and solve problems.

Also, the level of intrinsic and extrinsic academic motivation registered high level. Respondents are highly motivated for they have established their capability of reaching their academic goals. Also, the respondents have established a drive to pursue an activity simply for the satisfaction or pleasure derived from it and pursuing an activity out of a sense of obligation or a means to an end. Furthermore, they are motivated because they believe that the behaviors they engage in are enjoyable and will lead them to certain outcomes, such as praise and rewards.

On the correlation, the result proves that experience-based learning is significantly related to Academic Motivation. This corroborates the Self-Determination Theory of Edward Deci and Richard Ryan (1985, 2002) that when learners are motivated, they intend to accomplish something and undertake goal-oriented action to do so. Motivated action may be either self-determined or controlled. To the extent that it is self-determined, it is experienced as freely chosen and emanating from one's self, not done under pressure from some internal need or external force.

RECOMMENDATIONS

The results of the study generated the following recommendations. The results suggest that the school should practice experience-based learning among the learners. They should also embody the development of experiential learning that will motivate and enhance the learners' experience. Hence, teachers should apply authentic and hands-on learning in the teaching-learning process.

Also, the results suggest that the school should maintain the integration and application of strategies and techniques for motivating the learners. The school should conduct seminars and workshops for teachers to be informed of the updated learning methods and strategies. Further, the results suggest that learners must learn to appreciate the value of education. They should realize that great efforts and hard work are needed for them to have satisfactory grades and performance.

Furthermore, the results suggest that learners learn best when they themselves are exposed to the learning situations and when they enjoy learning and build their interest in learning. It will lead them to be active participants in the class. In addition to, hands-on experiments motivated students to take further actions such as doing extra reading and conducting experiments at home.

REFERENCES

Becker, (2010.) By the light of the tao. *European Journal of Social Work*, 12(3), 377-390. doi:10.1080/13691450902930779

Berk, (2013). Power motivation as a predictor of academic achievement. *A meta-analysis of research. Learning and Development Journal* (pp. 183- 212). Hillsdale, NJ: Erlbaum.

Black, (2010). Measuring peer pressure. A popularity and conformity in adolescent predicting school performance. *Journal of Youth and Adolescent*, 99(4), 63.

Bomia, 2011). Motivation and other learning components in classroom academic performance. *Journal of Educational Psychology*, 82(2), 22-48.

Covington (2014). Fear of failure-Stress and emotion: anxiety, anger,curiosity. *Journal of Psychology*, 85, 90-105.

Davis-Kean (2010). Parental factors and students' performance. Retrieved from <http://www.macrothink.org>.

Deci (2012). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 131(6),90-118.

Deci, E., & Ryan, R. (Eds.). (2002). *Handbook of self-determination research* Rochester, NY: University of Rochester Press.

DECI, E.L. & RYAN, R.M. (2000). "The "what" and "why" of goal pursuits: Human needs and the self-determination of behaviour", *Psychological Inquiry* 11(4): 227-268

Deck, (2014). *Combining methods in educational and social research*. Berkshire: Open University Press.

Feuerstein, R., Rand, Y., Hoffman, M., & Miller, R. (1980). *Instrumental enrichment: An intervention program for cognitive modifiability*. Baltimore, MD: University Park Press

Fox, K. (2011). Learning styles/ teaching styles: Should they or can they be matched? *Educational Leadership*, 36 (4), 238-244.

Fulgini (2011). Continuity of academic intrinsic motivation from child wood through late adolescence. *Journal of Education Psychology*, 73(1), 4-27.

Gagne, (2003). The role of autonomy support and autonomy orientation in pro-social behaviour engagement. *A Journal in Motivation and Emotion* 27(3): 199-223.

Girod, P. (2012). Students' academic motivation: mastery of goals. Retrieved from <https://www.boundless.com>

Goethe, (2010). *Research methods in social relations*. New York: Henry Holt and Company.

Goodenow (2013, Murdock & Miller 2010). – Engagement in academic work. The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology*, 21, 388-422.

Goodhand, J. (2012). Learning Stes and Learning Spaces. In R.R Sims and S.J. Sims (Eds.), *Learning Styles and Learning: A Key to Meeting the Accountability Demands in Education* (pp.45-92).

Gottfried, G. (2011). Development of gifted motivation: longitudinal research and applications. *International handbook on Giftedness*, 7, 617-631.

Hejazi, A., Rastgar, A., Karamdoust, N. & Ghorban Jahromi, R. (2010). Intelligence Beliefs, and Mathematical Academic Achievement: The Role of Cognitive Engagement and Effort in Practice. 24 (4). 289-305.

Houle, C. (2010). *Continuing Learning in the Professions*. San Francisco, CA: Jossey-Bass.

Howard, (2014). Leadership: Six Styles. *Education*, 254(2), 243-301.

Humphrey, C. (2009). By the light of the tao. *European Journal of*

Social Work,12(3), 377-390. doi:10.1080/13691450902930779.

Lenk, N. (2012). Need for achievement: Cooperative learning and students' academic achievement, process skills, learning environment, and self-esteem. In S. Sharan (ed.), *Cooperative learning theory and research*. New York: Praeger, 13-22.

Lepper, (2013). Socially shared metacognition of dyads of pupils in collaborative mathematical problem-solving processes. *Learning and Instruction*, 21(3), 379-393. doi: 10.1016/j.learninstruc.2010.05.002

Ryan & Deci, (2000). Motivation and education: The self determination perspective. *Educational Psychology*, 26, 325-346.

Trna, (2005). A comparative study of boys' and Girls' English study differences. *Journal of Language Teaching and Research*, 1(3), 309- 312.

Trna, J. (2005). Motivation and Hands-on Experiments. In *Proceedings of the International Conference Handson Science in a Changing Education*. HSci2005. Rethymno : University of Crete, pp. 169-174.

Wigfield (2011). Change in children's competence beliefs and subjective task values across the elementary school year: A 3year study. *Journal of Educational Psychology*, 88(3), 451- 469.

