

The Effect of Mastery Goal Orientation and Error Management on Developing Students' Skills in the Balanced Score Card Training and Decreasing Their Frustration in the Training Process

Hamid Reza Oreyzi¹, Maryam Sadat Akhbari^{1*}, Azade Askari³, Zeynab Darami⁴

Department of Psychology, University of Isfahan, Iran

ABSTRACT

Goal orientation and training type are two variables that have been investigated in a variety of research studies as factors influencing training outcomes. This study employed a 2x2 factorial design consisting of goal type (mastery versus performance) and training type (error management versus error avoidance), which are experimental factors. 56 undergraduate students from the University of Isfahan participated in this study. Three hypotheses were tested as follows:

Hypothesis I: Participants in the mastery goal training group will show greater skill acquisition in comparison to performance goal training group.

Hypothesis II: By integrating errors into the training process and encouraging the participants to adopt error management strategies, the participants in the error management group will show greater skill acquisition levels than the ones in the error avoidance (or the control) group.

Hypothesis III: The participants in the error management group will show a decreased sense of frustration in the training process, while the participants in the error avoidance group will experience an increased sense of frustration.

All participants were divided into 4 (2x2) groups. Everyone then set out to work individually on a Balanced score card problem. All Hypotheses were approved. The results of the study indicate that training students by the error management method has beneficial effects on them and that mastery goal orientation has a greater effect on students than performance goal orientation.

KEYWORDS: mastery goal orientation, error management, performance goal orientation, error prevention.

1. INTRODUCTION

Skill development and performance, and factors influencing them, at the end of training courses have always been the main concern of many research studies (e.g. Chillarege, Nordestrom, & Williams, 2003). Goal orientation of trainees and adoption of a training method – error learning or error prevention – in training courses are among such factors. Goal orientation refers to the individual's conceptual-cognitive framework, their interpretation of and response to their achievements (Janssen & Van Yperen, 2004). Research studies has identified the following dichotomy: mastery goal orientation (self-referenced goal orientation) and performance goal orientation (other-referenced goal orientation) (Hagger, Hein & Chatzisarantis, 2011), which are adopted in this study. Two methods – error prevention and error learning (error management) – are used in dealing with errors. The error learning method emphasizes that individuals learn from errors, while the error prevention method asks individuals to do their jobs without any errors (Lorenzet, Salas, & Tannenbaum, 2005). Research has shown that any of the above methods has a different effect on the motivation and performance of employees (e.g. Chillarege et al., 2003). This study sets out to investigate the effect of any of the above cases on individuals' performance and frustration.

What distinguishes this study from other studies is the use of an experimental method for developing and implementing a 2x2 factorial design, which consists of all the four levels. It also takes account of Lee, Tinsly, & Bobko's (2003) work, which emphasizes on the effect of culture on the outcomes of all types of goal orientation, further justifying the importance of this study in the Iranian society.

1.1 All Types of Goal Orientation and their Outcomes:

Goal theory has been developed by those scholars who take an interest in analyzing the effect of individuals' perceptions of success or failure on their own motivation. Indeed, this theory is based on individuals' interpretation and view of success or failure in activities performed according to their competencies (Hagger et al., 2011; Cetinkalp & Turksoy, 2011). Goal orientation, hence, is of two basic types: mastery goal orientation and performance goal orientation (Dweck, 1986; Nicholls, 1984; Hagger et al., 2011). Later on, other dichotomies were

*Corresponding Author: Maryam Sadat Akhbari, Department of Psychology, University of Isfahan, Iran
Email: akhbari_2000@yahoo.com

created such as those of Elliot and his workers (Elliot, 1999; Pintrich, 2000). They divided such goal orientations into two types –avoidance and approach goal orientations – and introduced the following four goal orientations: mastery goal orientation, performance goal orientation, mastery-avoidance goal orientation, and performance-avoidance goal orientation (Hagger *et al.*, 2011). Since, the classic dichotomies have been employed in this study, what follows is a description of the first two concepts.

Mastery goal oriented people seek to enhance their individual competencies through developing their skills (Essles & Wigfield, 2002; Chin, Khoo & Low, 2012). They do not pay any attention to other people's appraisal of their abilities and that whether they receive a good or bad appraisal (Elliot & Church, 1997). Indeed, what is of value to them is the skills they develop in the process of performing their jobs (McCarthy, 2011). Mastery goal orientation is, generally speaking, inclined towards a general tendency towards developing new skills, deeper engagement in tasks and taking pleasure in doing them, adopting and adapting to positive behaviors, perseverance in the face of setbacks, adopting deep processing strategies for solving complex issues and being intrinsically motivated (Dweck, 1989; Elliot & Dweck, 1988; Van Yperen, 2006; Poortvliet, Janssen, Yperen & Van de Vliert, 2007; Hafsteinsson, Donovan & Breland, 2007; Martin, Marsh, Debus & Malmberg, 2008; Bakirtzoglou, Ioannou, 2011; Cetinkalp *et al.*, 2011; Chin *et al.* 2012)

Performance goal oriented people seek to elicit people's desirable appraisal about their capabilities and avoid their negative appraisal about them (Dweck, 1986). Indeed, they see themselves in relation to other people and seek to be the best among them (Bakirtzoglou & Ioannou, 2011). They show off their capabilities to other people and see competition as the basis for the evaluation of their success (Elliot & Church, 1997). Due to such competitiveness, they pay little attention to others, and by any means, even at the expense of exploitation of others, they seek to get valuable information (Poortvliet *et al.*, 2007). This may account for the fact that some researches have shown a positive correlation between performance goal orientation and great self-efficacy and good grades (Dweck & Leggett, 1988; Pintrich & Schunk, 1996). Such a goal orientation may lead to less perseverance in the face of failures, avoidance of challenging tasks, and fear of the negative appraisal of others (Dweck, 1989; Elliot & Dweck, 1988; Hafsteinsson, 2007).

In fact, these people tend to take on easier tasks with a higher likelihood of success (Tyson, Linnenbrink-Garcia & Hill, 2009), and are extrinsically motivated (Chin *et al.*, 2012; Van Yperen, 2006). As it is clear from the above statements, research report more positive outcomes for mastery goal orientation than performance goal orientation. It is important to note that although these two goal orientation types are considered separate from each other, but both may be present to some degree in an individual (McCarthy, 2011).

Based on what was said above, the first hypothesis is formulated as follows:

Hypothesis I: participants in the mastery goal orientation group tend to develop more skills than the ones in the performance goal orientation group.

1.2 Error Prevention and Error Learning:

As it was mentioned above, two methods of error prevention and error learning are adopted in dealing with errors. The error learning method emphasizes that individuals learn from errors, while the error prevention method asks individuals to do their jobs without any errors.

Advocates of Skinner's Behaviorism support the error prevention perspective and believe that error commitment during the training process may lead to anxiety, lack of motivation, and failure of employees (Skinner, 1968). On the other hand, Frese and Harlow are among those who advocate the error learning perspective and consider it a kind of management (Frese, 1995; Frese & Altmann, 1989). As it is always possible to commit errors at every level of skills (Prumper, Zapf, Brodbeck, & Frese, 1992; Reason, 1990), this perspective is based upon the fact that it is better to learn from errors rather than avoid them (Frese, 1995). In fact, as Harlow puts it, error learning is learning based on errors and error factors are response tendencies that lead to wrong responses that learners seek to reduce and finally remove them altogether in the process of learning (Hergenhahn & Olson, 1993).

The error learning method is distinguished from the classic error prevention method in three ways:

- The error learning method makes use of a heuristic learning environment which is in contrast to the structured error prevention environment.
- This method insists on committing errors in contrast to the tendency in the classic error prevention method to avoid errors.
- The error learning method aims at reducing anxiety and failure as a result of committing errors (Bell, 2002).

While allowing individuals to commit errors in the process of their learning, this method emphasizes that they admit and correct their thought and action models' constraints and weaknesses. Such errors, indeed, serve as feedback and allow individuals to overcome their weaknesses (Manktelow & Jones, 1987; Rasmussen, 1990; Waern, 1993; Katzeff, 1990). Error commitment in the learning process make both the training process and the individual performance no longer automatic and repetitive, and brings them under control that they demand more attention and efforts, and finally lead to learning promotion (Frese & Altmann, 1989; Van Lehn, 1991; Frese, 1995; Ivancic &

Hesketh, 1995-1996; Ivancic, 1998). The error learning method can also enhance learners' creativity, discovery, and meta cognitive activities (Frese, 1995). Through error learning in the learning process, individuals can gain experiences which can be drawn upon to solve later problems, and become capable of dealing with errors in the future (Ivancic, 1998; Van Lehn, 1991). Therefore, it can be expected that the error learning method lead to a higher level of performance and skill development than the error prevention method. Hence, the second hypothesis of this study is as follows:

Hypothesis II: based on the error learning method, participants tend to show greater skill acquisition levels than the ones in the error avoidance (or the control) group.

Making errors can lead to a sense of frustration and anxiety in the person who has made them (Frese & Altmann, 1989; Heimbeck, Frese, Sonnentag & Keith, 2003), which in turn lead to a decrease in the person's concentration levels (Mikulincer, 1989). But if making errors constitute an important part of the learning process and be seen as a positive incident, it can lead to higher motivation (Bell, 2002; Nordstrom, Wendland, Williams, 1998), and further make individuals regard errors and problems as mere challenges (Dweck, 1986). The error learning method is therefore based on the above premise and seeks to naturalize error commitment in the training process so that individuals suffer from less anxiety (Frese, 1995). Moreover, when individuals commit errors in the process of their learning, they tend to show more tolerance of errors in the future (Bell, 2002).

Participants in the error learning group initially suffer from more frustration than the ones in the error avoidance group because the former feels more distance to their goals than the latter. This in turn, according to Amsel's Frustration Theory and Zeigarnik's Unfinished Task Theory, leads to an increase in motivation and individual's efforts (Hergenhahn & Olson, 1996). But, at the end of the training course, with a view to the error learning method and its positive outcomes (divergent responses and creativity), the participants in the error learning group suffer from less frustration, while this process seems to be vice versa for the ones in the error avoidance group (Nordstrom, et al., 1998).

According to the above statements, the third hypothesis in this study is presented as follows:

Hypothesis III: The error learning group suffers from more frustration at the beginning of the training process and then suffer from less frustration at the end of the training process, while this tendency is vice versa for the error avoidance group.

2. REVIEW OF LITERATURE

Various researches have been conducted in Iran on the effects of error learning and error prevention and of mastery and performance goal orientations on participants' skills and frustration. What follows is a review of some of them.

Jowkar (2005) investigated the relationship of mastery goal orientation, performance goal orientation, and avoidance goal orientation with metacognition, cognition, and motivation. His results showed that in the metacognitive and cognitive aspects, mastery goal orientation group has altogether a higher predictability than the other two goal orientation groups. In contrast, in the motivation aspect, performance-avoidancegoal orientation (in a reverse fashion) and performance-approachgoal orientation have higher predictabilities respectively.

Haghighi, Damghani Mirmahale, & Shokrkon(2005) reported of a positive and significant relationship between mastery goal orientation and educational efficiency and all autonomous learning strategies except for request-for-help-from-adults strategy. Oreyzi, Asgari, & Akhbari (2008). investigated the effect of encouraging students to generate responses, which consists of anxiety-free responses and assessment-based (error-free) learning, on their innovation, planning, and independent thinking. The results showed that students who generated responses without any fear of assessment outperformed the other group in innovation, planning, and independent thinking. Frese et al. (1991) examined the effect of the error learning and error prevention methods on participants' performance and failure and noted that the error learning group outperformed the other group in non-speed tests. Their findings also showed that while the error learning group's frustration levels stayed the same throughout the training process, but the error prevention group'sfrustration levels significantly rose throughout the training process. Harackiewicz, Barron, Carter, Lehto & Elliot (1997) & Harackiewicz, Barron, Tauer, Carter, & Elliot (2000) showed a positive correlation between performance goal orientation and scientific performance. On the other hand, Covington & Omelich (1984), and Yates (2000) failed to prove the existence of the negative effect of performance goal orientation on students' performance. Phillips & Gully (1997) reported of a positive relationship between mastery goal orientation and higher exam grades. Button, Mathiew & Zajac (1996) reported of a positive relationship between mastery goal orientation and the average. Butler (1993) showed a positive relationship between mastery goal orientation and task accomplishment. Block, Roney, Geeter, Lopez & Yang (1995). showed a positive relationship between mastery goal orientation and the quality and quantity of solutions. It is important to note that none of the above works established a connection between performance goal orientation and performance. Nordstrom et al. (1998) indicated that error management and mastery goal orientation training can improve performance, increase intrinsic motivation and decrease frustration. Chillarege et al. (2003) found out that error management training lead to higher performance, learning, and cooperation. They also found out that mastery goal

orientation contribute to higher performance and motivation than performance goal orientation. Janssen & Van Yperen (2004) found out that those employees who have strong mastery goal orientation are more effective at work because they can establish better quality communications with their supervisors than those with performance goal orientation. Cetinkalp & Turksoy (2011) in their study of 159 footballers noted that mastery goal orientation contribute to footballers' skill improvement.

3. MATERIALS AND METHODS

3.1 Participants and Research Procedures:

Since this study is of an experimental type and it is difficult to ascertain the effect of intervention, hence it was not possible to use random sampling and instead volunteer sampling was used. Volunteer sampling is commonly used in such studies Gall, Borg, Gall (1996). Therefore, experimental studies normally make use of samples of students. It also applies to industrial cases as in Flanagan's industrial test validation in Iran, conducted on samples of students. Therefore, students constitute a more valid sample in experimental studies, especially in those studies which aim at simulations or simulation scenarios. The sample size, regarding the 2x2 factorial design used in this study, consisted of 10 to 15 students per every experimental unit, but 14 (56 totally) were deemed to be sufficient, which was further confirmed by the statistical power of 0.8. Therefore, 56 industrial and organizational psychology students participated in this study. All students were trained for the Balanced Scorecard model in the employee psychology course in the undergraduate program. The Balanced Scorecard model investigates an organization's performance in the four areas of financing, customers, internal business processes and employee development. A scenario* was developed for an airline company which asked the students to offer solutions for improving the company's performance based on the Balanced Scorecard model. Students had to first determine the internal business processes, then associated the key employees with those internal business processes. Finally they offered their solutions and determined their effects on the areas of financing and customers. Two groups – the error learning group (experimental or intervention group) and the error avoidance group (control group) – were formed and the students were randomly allocated to the two groups. The intervention was independently administered by two graduate psychology students (as research assistants). Every student acted independently and the total response time was 15 minutes. In every group one half of the students engaged in mastery goal orientation activities and the other half in performance goal orientation ones. Mastery goal orientated students, for example, were told that skill acquisition is what matters and that they are compared against themselves, but the other performance goal orientated students were told that their performance is measured against those of other students. The error learning students were told to learn from their errors and correct them. But the error avoidance students were told that any error will lower their overall grades. To make sure that the intervention is properly administered, the independent variables of goal orientation and error learning/avoidance as well as the dependent variables of learning and motivation were studied.

3.2 Research Design:

This study employed a 2x2 factorial design consisting of goal type (mastery versus performance) and training type (error management versus error avoidance). The students were randomly allocated to all four training groups. All subjects were kept unaware of the purpose of the study.

3.3 Research Tools:

The following three tools were used in this study: Emotional Response Questionnaire (Frese *et al.*, 1991), the Balanced Scorecard skills, and the effectiveness of error type and goal type (Nordstrom *et al.*, 1998). The initial Emotional Response Questionnaire was developed by Frese to be used with computers. The five questions presented in his work were adapted to use in this study. This scale was used to measure students' frustration levels before and after the training. To examine the reliability of the scale, Cronbach's alpha was used with a sample of 40 people and test-retest method was also used with the same sample of students. Regarding the Balanced Scorecard skills, a questionnaire with 20 items was used to which all the participants responded. Kuder-Richardson reliability coefficient and integrative testing were used to determine the reliability of the questionnaire. It is for this reason that integrative tests can be used for the Balanced Scorecard skills. To determine the validity of the tools, a question was asked which analyzed the notion of the construct as a whole, and then its consistency with all other elements was determined. To analyze the intervention, 8 questions were used, of which four questions (e.g. "Committing errors while learning is useful".) were intended for the effectiveness of the intervention on error type, and the other four ones (e.g. "I pay attention to others' evaluation of my performance during the training".) were intended for the effectiveness of the intervention on goal type. This scale was developed by Nordstrom *et al.* (1998). The results of the reliability of the tools are presented in Table 1 below.

*This scenario was adapted from Kaplan & Norton's (2004) "Strategy Map".

Table 1. The Reliability of the Tools Used in this Study

Hypothesis	Questionnaire	Developer	Measurement	Number of Items	Cronbach's Alfa and Kuder-Richardson Reliability	Test-Retest and Integrative Test Reliability	Validity Coefficient
Hypothesis III	Emotional Response	Frese et al. (1991)	Dependent Variable	5	0.72	0.74	0.56
Hypotheses I and II	Balanced Scorecard	The present Researcher	Dependent Variable	20	0.89	0.91	0.82
Intervention Analysis	The Effectiveness of the Error Type	Nordstrom et al. (1998)	Independent Variable	4	0.69	0.71	0.59
Intervention Analysis	The Effectiveness of the Error Type The Effectiveness of the Goal Type	Nordstrom et al. (1998)	Independent Variable	4	0.71	0.73	0.57

4. RESULTS

Although it is common to measure dependent variables only in experimental research, but the dependent variables were measured in this study to make sure of the proper administration of the intervention. Table 2 below presents the means and standard deviations for the error type and goal type, and the comparison of the two experimental and control groups in view of the intervention. According to Table 2, the intervention has left the desired effect.

Table 2. Intervention Analysis (Error Type and Goal Type)

	The Effectiveness of the Error Type				The Effectiveness of the Goal Type			
	Mean	Standard Deviation	Variance	T-Test	Mean	Standard Deviation	Variance	T-Test
Experimental Group	13.12	1.26	1.59	18.57**	12.83	1.17	1.37	21.17**
Control Group	6.62	1.32	1.74		5.42	1.39	1.94	

**=p<0.01

The experimental group with the effectiveness of the error type=error learning

The experimental group with the effectiveness of the goal type=mastery goal orientation

The control group with the effectiveness of the error type=error avoidance

The control group with the effectiveness of the goal type=performance goal orientation

To test hypotheses 1 and 2, variance analysis was used. The results are presented in Table 3. According to Table 3, the observed F regarding the training type, the goal type, and the interaction between the training type and the goal type is statistically significant.

Table 3. The Comparison of the Effects of the two kinds of Intervention (the Training Type and the Goal Type) on the Students' Skill Training in the Balanced Scorecard

		Total Sum of Squares	Degrees of Freedom	Mean Squares	F
Main Effect	Training type	1649.32	1	1649.32	5.42*
	Goal type	1377.12	1	1377.12	4.53*
Interaction Effect	Interaction between Training Type and Goal Type	1440.96	1	1440.96	4.74*
Error Factor	Within Group	15808.9	52	304.01	

*=p<0.05

Based on the above results, the T-Test was used to compare the experimental and control groups together. The results are presented in Table 4. According to Table 4, students' mastery goal orientation and error learning training lead to higher skill acquisition in the Balanced Scorecard. Thus, hypotheses 1 and 2 are approved.

Table 4. The analysis of two kinds of Intervention, Training Type, and Goal Type

Intervention Analysis	Training Type Comparison						Goal Type Comparison					
	Mean	Standard Deviation	Variance	Mean	Standard Deviation	Variance	Mean	Standard Deviation	Variance	Mean	Standard Deviation	Variance
	27.34	1.92	3.68	7.23	1.33	1.76	18.27	2.32	5.38	4.53	1.83	3.54
Number	28			28			28			28		
Independent T-Test	45.70**						24.5**					

**=p<0.001

Regarding Hypothesis III, as the Emotional Response Questionnaire (ERQ), which measured the participants' failure levels, was implemented before and after the training, variance analysis was used with repeated values. As the Interaction Effect, $F(1.52) = 32.35^{**}$ (Time x the training type), was statistically significant, failure levels before and after the training were compared together and the results were presented in Table 5 below.

Table 5. The Failure Levels of the two Error Learning and Error Avoidance Groups at the Beginning and at the End of their Training in the Balanced Scorecard

Group	Goal Type	Failure Levels at the Beginning of the Training		Failure Levels at the End of the Training	
		Mean	Standard Deviation	Mean	Standard Deviation
Error Learning Group	Mastery Goal Orientation	29.87	2.09	22.35	3.69
	Performance Goal Orientation	31.46	3.56	18.84	4.66
Error Avoidance Group	Mastery Goal Orientation	16.11	3.49	29.16	3.52
	Performance Goal Orientation	16.34	3.28	28.41	4.63

To test Hypothesis III, the Independent T-Test was used to compare the two groups at the beginning and at the end of the Balanced Scorecard Training. At every within-group comparison, the T-Test was used. The results were presented in Table 6. According to Table 6, the mean perceived failure levels of the error learning group were initially higher but decreased towards the end. The error learning group suffered from significantly lesser and lesser frustration over the time, while the error avoidance group did vice versa, hence Hypothesis III was approved.

Table 6. The Failure Levels of the two Error Learning and Error Avoidance Groups during their Training in the Balanced Scorecard

Time	Mean Error Learning Group	Mean Error Avoidance Group	Independent T-Test
The Beginning	30.66	16.22	17.24*
The End	20.59	28.78	-9.24*
Dependent T-Test	10.09**	-12.54**	-

**= $p < 0.001$

*= $p < 0.05$

5. DATA ANALYSIS AND CONCLUSION

This study aimed to analyze the effect of two kinds of goal orientation (mastery and performance) and two kinds of training (error learning and error avoidance) on students' skill acquisition. Students' frustration levels in the two error learning and error avoidance groups were also measured. What has made this study different from other ones has been its experimental method, which is the best method that allows researchers to investigate causal relationships between different phenomena. This study, indeed, dealt with both types of goal orientation and both types of learning with the sample of students, which was done by the intervention.

Therefore, Hypothesis I was first dealt with, which was concerned about mastery/performance goal orientation, and then hypotheses 2 and 3 were dealt with, which were concerned about error learning/avoidance.

Based on Hypothesis I, skill acquisitions by both groups with both mastery and performance goal orientations was compared together. The results approved this hypothesis and it was found out the mastery goal orientated group had higher skill levels than the performance goal orientated one. To illustrate this fact, some points can be made.

Chiaburu & Marinova (2005) and Fisher & Ford (1998) stated that those individuals with mastery goal orientation are more motivated to engage in learning real life issues, focus on increasing their learning capacity, and upon failing, they just see their failure as a feedback for their performance and as a result of their weaknesses, and continue more decidedly to enhance their knowledge; but those individuals with performance goal orientation are less motivated to learn, and if facing any challenge or failure, stop their efforts. Therefore, it seems natural that the mastery goal orientated people outperform the performance goal orientated ones.

Another important point is that the mastery goal orientated people associate their performance with their efforts, and believe that they can improve their abilities with more efforts and experiences. That is the reason they adopt more complex and deep processing strategies to improve their performance, which demands more efforts; but the performance orientated people see their work as an indication of their abilities (not their efforts). These people believe that an individual's ability level is constant and anyone who puts more efforts into their tasks has a weakness that has made them work harder to obtain their results. Therefore, they adopt more surface processing strategies, which demand less efforts, and may evade their responsibilities because failure to do them means their lack of abilities (Fisher & Ford, 1998; Stevens, Gist, 1997; Brett & Vandewalle, 1999). This negative view of taking more

efforts and the adoption of surface processing strategies can account for the poorer performance of the performance goal orientated people than the mastery goal orientated ones.

The results of Hypothesis I testing were in line with Haghighi et al. (2005), Phillips & Gally (1997), Butler (1993), Block et al. (1995), Nordstrom et al. (1998), Janssen & Van Yperen (2004), Cetinkalp & Turksoy (2011).

Regarding Hypothesis II, the experimental results indicated that people could acquire more skills by the error learning method. To illustrate this fact, several points can be made. The first point is concerned with feedback. Those people in the error learning group received feedback upon committing any error while performing their tasks, which showed that what was wrong and what was to be avoided. The feedback received about errors can help individuals both become aware of the results and take a critical stance to help them improve their performance (Manktelow & Jones, 1987; Rasmussen, 1990). The error learning group, therefore, acquired more skills than the error avoidance one.

The second point regarding Hypothesis II is concerned with the stress levels experienced by everyone in both groups. As it was mentioned earlier, the error avoidance group (the control group) experienced anxiety, frustration, and stress while making errors, which inhibited them from proper information processing. But the error learning group was encouraged to make errors, which reduced their stress, and anxiety as a result of doing so (Mikulincer, 1989). These individuals, therefore, are enabled to find better ways of facing problems and enhance their skills.

The results of Hypothesis II testing were in line with Harlow's work on learning. As it was said before, according to Harlow, error learning is learning based on errors and error factors are response tendencies that lead to wrong responses that learners seek to reduce and finally remove them altogether in the process of learning. Moreover, since the initial learning involves removing the error factors, it is slow; but the next learning is faster because it is based on a strategy which can be applied to all aspects of the problem (Hergenhahn & Olson, 1993). These results were also in line with the findings related to Hypothesis III: that the initial learning in the error learning group was slow because of error commitments, and could possibly lead to higher frustration levels, but learning in the next stages were faster and frustration levels decreased accordingly.

To explain Hypothesis III, in addition to Harlow's work (mention above), Amsel's Frustration Theory can also be drawn upon. Amsel noted that the absence of an expected event can lead to frustration, which in turn, motivates people to increase their efforts (Ibid., 1993). In other words, according to the error learning method, error commitment and frustration levels are initially high, which lead to an increase in people's efforts, and according to the results of the study, as error commitment decreases, the error learning group acquires more skills than the error avoidance group, and the initial frustration will serve as a motive for later successes. Zeigarnik's Unfinished Task Theory also states that unfinished tasks remain longer in the memory than finished ones and evoke more details. He justified this phenomena in the light of the motivational properties of problems which are present until those problems are solved (Ibid., 1993). We saw in this study that whenever students in the error learning group made errors, it meant that they did not finish their tasks yet, therefore, they worked harder, and acquired more skills than the students in the error avoidance group.

Some of the studies conducted on performance and performance goal orientation had produced similar results. Covington & Omelich (1984) and Yates (2000), for example, failed to prove the existence of the negative effect of performance goal orientation on students' performance. Oreyzi et.al. (2008), and Chillarege et. al.(2003) also showed the positive effect of the error learning on students' performance, which is in line with the results of this study. Frees et al. (1991) also showed the positive effect of the error learning method on decreasing students' frustration levels and improving their performance in contrast to the error avoidance method. But Phillips & Gally (1997), Button et al. (1996), Butler (1993), Block et al. (1995), Chillarege et al. (2003), and Janssen & Van Yperen (2004) reported of the positive effect of mastery goal orientation on improving performance, which is in contrast to the results of this study.

Based on the results of this study, it is suggested that students avoid the conventional error avoidance method during their training and feel free to make errors. As a result, they can learn from their errors and develop their skills, which in turn, lead to higher productivity and effectiveness in their courses. Moreover, it was found out that the error learning method will eventually contribute to reduced frustration levels in individuals and make them see their errors as challenges. This can result in individuals' higher mental health and in practical application of what has been learned. To that end, it is better to substitute the error learning method for the conventional error avoidance one. Educators and instructors also need not only allow error commitment, but also should introduce it as a natural and even helpful phenomenon, and encourage their students to learn from their errors, overcome their weaknesses, and do not be concerned about others' evaluation or their erroneous responses so that they can enhance their skills and capabilities. Indeed, the conventional education, which sees error commitment as a sign of students' weakness, has been under attack today because it considers such a weakness as something that may compromise the quality of education; while recently the quality of responses, whether erroneous or not, has provided a basis for fostering students' creativity. Brainstorming, for example, encourages individuals to generate as many responses as possible and do not be concerned about making any error. In other words, emphasis has shifted away from the correct nature of responses and to the generation of responses. It is only after the generation of responses that the finished task can

be evaluated. Educators and instructors are advised to encourage their students to adopt mastery goal orientation and avoid motivation through comparing themselves with others because mastery goal orientation is associated with much less negative outcomes like anxiety than performance goal orientation, and most studies have identified the positive relationship of mastery goal orientation with performance, higher quality and quantity of solutions, and other positive outcomes; while it is not true for performance goal orientation, and expectation of positive outcomes is bound to many factors including the culture and personality of the sample of individuals.

Moreover, as there have been more recent goal orientation dichotomies, other researchers are advised to use such dichotomies in their investigations.

Researchers are also advised to use more different, multicultural populations to compare and contrast their results, which can cast some light on the role of culture in the different types of goal orientation and error management.

One of the limitations of this study was the inevitable use of the available sample. Since it was conducted in classrooms, every intervention was administered in each one of the classroom. And while it has certainly gained ecological credit accordingly, This study suffers from a limitation due to the sample which was not randomly allocated. On the other hand, since the administration time was synchronous with the usual class hours, it might have influenced students' performance; students, for example, were fresher in the mornings than in the evenings.

REFERENCES

- Bakirtzoglou, P., & Ioannou, P. (2011). Goal orientation, motivational climate and dispositional flow in Greek secondary education students participating in physical education lesson: Differences based on gender. *Facta Universitatis*, 9(3), 295-306.
- Bell, B. S. (2002). *An examination of the instructional , motivational, and emotional elements of error training*. Unpublished doctoral dissertation, Michigan State University.
- Block, C. J., Roney, C. J. R., Geeter, J., Lopez, P. D., & Yang, T. (1995). *The influence of learning and performance goal orientations on anxiety, motivation and performance in a complex task*. Paper presented at the 55th annual meeting of the Academy of Management, Vancouver, Canada, August.
- Brett, J. F., & VandeWalle, D. (1999). Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology*, 84(6), 863-873.
- Butler, R. (1993). Effects of task- and ego-achievement goals in information-seeking during task engagement. *Journal of Personality and Social Psychology*, 65, 18 –31.
- Button, S. B., Mathiew, J. E., & Zajac, D.M. (1996). Goal orientation in organization research: A conceptual and empirical foundation. *Organizational Behavior and Human Decision Processes*, 67, 26 – 48.
- Cetinkalp, Z. K., & Turksoy, A. (2011). Goal orientation and self-efficacy as predictors of male adolescent soccer players' motivation to participate. *Social Behavior and Personality*, 39(7), 925-937.
- Chiaburu, D. S., Marinova, S. V. (2005). What predicts skill transfer? An exploratory study of goal orientation, training self-efficacy and organizational. *International Journal of Training and Development*, 110-123.
- Chillarege, K. A., Nordestrom, C. R., & Williams, K. B. (2003). Learning from our mistakes: Error management training for mature learners. *Journal of Business and Psychology*, 17(3), 369-385.
- Chin, N., Khoo, S., & Low, W. (2012). Self-determination and goal orientation in track and field. *Journal of Human Kinetics*, 33, 151-161.
- college students of different fields of study. *Journal of Social Sciences & Humanities of Shiraz University*, 22(4), 56-71.
- Covington, M. V., & Omelich, C. L. (1984). Task-oriented versus competitive learning structures: Motivational and performance consequences. *Journal of Educational Psychology*, 76, 1038-1150.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, 41, 1040-1048.
- Dweck, C. S. (1989). Motivation. In A. Lesgold & R. Glaser (Eds.), *Foundation for a psychology of education* (pp. 87-135). Hillsdale, NJ: Lawrence Erlbaum.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256-273.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist*, 34, 169-189.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 72, 218-232.

- Elliot, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54, 5-12.
- Essles, J. S., Wigfield, A. (2002). Motivational beliefs, values, and goal. *Annual Review of Psychology*, 53, 109-132.
- Fisher, S., Ford, J. K. (1998). Differential effects of learner effort and goal orientation on two learning outcomes. *Personnel Psychology*, 50, 397-420.
- Frees, M., Brodbeck, F., Heinbokel, T., Mooser, C., Scheiffenbaum, E., & Thiemann, P. (1991). Errors in training computer skills: On the positive function of errors. *Human Computer Interaction*, 6, 77-93.
- Frese, M. (1995). Error management in training: Conceptual and empirical results. In C. Zuccheromaglio, S. Bagnara, & S. U. Struchy (Eds.), *Organizational learning and technological change* (pp. 112-124). New York: Springer-Verlag.
- Frese, M., & Altmann, A. (1989). The treatment of errors in learning and training. In L. Bainbridge and S. A. R. Quintanilla (Eds.), *Developing skills with new technology* (pp. 65-86). Chichester: Wiley & Sons.
- Frese, M., Brodbeck, F., Heinbokel, T., Mooser, C., Schleiffenbaum, E., & Thiemann, P. (1991). Errors in training computer skills: On the positive function of errors. *Human Computer Interaction*, 6, 77-93.
- Gall, M. D., Borg, W. R., Gall, J. P. (1996). *Educational research: an introduction*. Longman.
- Hafsteinsson, L. G. Donovan, J., & Breland, B.T. (2007). An Item Response Theory Examination of Two Popular Goal Orientation Measures. *Educational and Psychological Measurement*, 67, 4, 719-739.
- Hagger, M. S., Hein, V., & Chatzisarantis, N. L. D. (2011). Achievement goals, physical self-concept, and social physique anxiety in a physical activity context. *Journal of Applied Social Psychology*, 41, 6, 1299-1339.
- Haghighi, J., Damghani Mirmahale, M., Shokrkon, H. (2005). A survey of the relationship between important antecedent of mastery goal orientation and orientation and its selected consequences in the first grade female students at Ahvaz high schools. *Journal of Education and Psychology*, 12(1), 87-110
- Harackiewicz, J. M., Barron, K. E., Carter, S. M., Lehto, A. T., & Elliot, A. J. (1997). Predictors and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology*, 73, 1284-1295.
- Harackiewicz, J. M., Barron, K. E., Tauer, J. M., Carter, S. M., & Elliot, A. J. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology*, 92, 316-330.
- Heimbeck, D. Frese, M. Sonnentag, S., & Keith, N. (2003). Integrating errors into the training process: The function of error management instructions and the role of goal orientation. *Personnel Psychology*, 56, 333-361.
- Hergenhahn, B. R., Osmon, M. H. (1993). *An introduction to theories of learning* (4th ed.). Pearson Prentice Hall
- Ivancic, K. (1998). *Errors as a means of promoting transfer of training*. Unpublished doctoral dissertation. University of New South Wales, Australia.
- Ivancic, K., & Hesketh, B. (1995). Making the best of errors during training. *Training Research Journal*, 1, 103-125.
- Janssen, O., & Van Yperen, N. W. (2004). Employees' goal orientation, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. *Academy of Management Journal*, 47(3), 368-384.
- Jowkar, B. (2005). The relationship between goal orientation and self-regulation among
- Kaplan, R. S., & Norton, D. P. (2004). *strategy maps: Converting intangible assets to tangible outcomes*. Harvard Business Press
- Katzeff, C. (1990). System demands on mental models for a full text database. *International Journal of Man-Machine Studies*, 32, 483-509.
- Lee, C., Tinsly, C., & Bobko, P. (2003). Cross-cultural variance in goal orientations and their effects. *Applied Psychology: An International Review*, 52(2), 272-297.
- Lorenzet, S. J., Salas, E., & Tannenbaum, S. I. (2005). Benefiting from mistakes: The impact of guided errors on learning, performance, and self-efficacy. *Human Resource Development Quarterly*, 16(3), 301-322.
- Manktelow, K., & Jones, J. (1987). Principles from the Psychology of thinking and mental models. In M. M. Gardiner and B. Christie (Eds.), *Applying cognitive Psychology to user-interface design* (pp. 83-118). Chichester: Wiley & Sons.

- Martin, A. J., Marsh, H. W., Debus, R. L., & Malmberg, L. (2008). Performance and Mastery Orientation of High School and University/College Students: A Rasch Perspective. *Educational and Psychological Measurement*, 68, 3,464-487.
- McCarthy, J. J. (2011). Exploring the relationship between goal achievement orientation and mindfulness in collegiate athletics. *Journal of Clinical Sport Psychology*, 5, 44-57.
- Mikulincer, M. (1989). Cognitive interference and learned helplessness: The effects of off-task cognitions on performance following unsolvable problems. *Journal of Personality and Social Psychology*, 57, 129-135.
- Nicholls, L. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, 91, 328-346.
- Nordestrom, C., R., Wendland, D., & Williams, K. B. (1998). To err is human: An examination of the effectiveness of error management training. *Journal of Business and Psychology*, 12(3), 269-282.
- Oreyzi, H., Asgari, A., & Akhbari, M. (2008). Error effectiveness on creativity and programming and field independence thought of engineering students. *Iranian Journal of Engineering Education*, 10(37), 31-47.
- Phillips, J.M., & Gully, S.M. (1997). Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal-setting process. *Journal of Applied Psychology*, 82, 792– 802.
- Pintrich, P. (2000). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology*, 25, 92–104.
- Pintrich, P. R. (2000). An achievement goal theory perceptive on issues in motivation terminology, theory, and research. *Cotemporary Educational Psychology*, 25, 92-104.
- Pintrich, P. R., & Schunk, D. (1996). *Motivation in education: Theory, Research and Applications*. Englewood Cliffs, NJ: Merrill Prentice-Hall.
- Poortvliet, P. M., Janssen, O. Yperen, N. And Van de Vliert, E.(2007). Achievement Goals and Interpersonal Behavior: How Mastery and Performance Goals Shape Information Exchange. *Personality and Social Psychology Bulletin*. 33, 10, 1435-1447.
- Prumper, J., Zapf, D., Brodbeck, F. C., & Frese, M. (1992). Some surprising differences between novice and expert errors in computerized office work. *Behavior & Information Technology*, 11, 319-328.
- Rasmussen, J. (1990). The role of error in organizing behavior. *Ergonomics*, 33, 1185-1199.
- Reason, J. (1990). *Human error*. New York: Cambridge University Press.
- Skinner, B. F. (1968). *The technology of teaching*. New York: Apple-Century-Crofts.
- Stevens, C. K., Gist, M. E. (1997). Effects of self-efficacy and gial-orientation training on negotiation skill maintenance: What are the mechanisms? *Personnel Psychology*, 50, 955-978.
- Tyson, D. F., Linnenbrink-Garcia, L., & Hill, N. E. (2009). Regulating debilitating emotions in the context of performance: Achievement goal orientations, achievement-elicited emotions, and socialization contexts. *Hum Dev*, 52, 329-56.
- Van Lehn, K. (1991). Rule acquisition events in discovery of problem-solving strategies. *Cognitive Science*, 15, 1-47.
- Van Yperen, N. W. (2006). A novel approach to assessing achievement goals in the context of the 2 × 2 framework: Identifying distinct profiles of individuals with different dominant achievement goals *Personality and Social Psychology Bulletin*, 32, 1432-1445
- Waern, Y. (1993). Varieties of learning to use computer tools. *Computers in Human Behavior*, 9, 323-339.
- Yates, S. M. (2000). Task involvement and ego orientation in mathematics achievement: A three year follow-up. *Issues in Educational Research*, 10, 77-91.