J Biochem Tech (2018) Special Issue (2): 185-193
ISSN: 0974-2328

The Effect of Information Literacy Training on Self-Efficacy of Nursing Graduate Students of Kerman University of Medical Sciences

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Received: 22 November 2017 / Received in revised form: 18 May 2018, Accepted: 23 May 2018, Published online: 05 September 2018
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Abstract

Introduction: The nurses are the largest providers of health care and have a basic role in continuity, maintaining and improving health. The aim is to study the effect of information literacy training on self-efficacy of the nursing graduate students of Kerman University of Medical Sciences. Method: This is a semi-experimental study with pre and post-test and follow up with control group. The target population was comprised of the nursing graduate students of Kerman University of Medical Sciences, which from, 65 were selected by simple random sampling and then by random assignment, 35 of them were placed in test and 30 in control groups. The required information was collected by a questionnaire comprising of three parts, namely demographic, information literacy skills and self-efficacy.The gathered data were analyzed using repeated measure ANOVA method with SPSS software Ver.21. Findings: There was a significant difference only in self-efficacy variable between men and women, but there was significant difference between educational groups for both information literacy and self-efficacy variables (P=0.001). Information positioning variable, solely, had the capability to predict 0.792 of the variance in self-efficacy variable. This amount reached to 0.847 and 0.872 within the second and third steps, by adding two other variables namely information documentation and information utilization, respectively (P=0.001). All self-efficiency components increased significantly in post-test group (P=0.001). Conclusion: Training information literacy skills to students increase information-seeking skills, familiarity with internet and information databases and satisfying information needs which lastly increase their self-efficacy beliefs, in a way that such effects are evident in all aspects of self-efficacy skills.

Keywords: Information Literacy, Self-Efficacy, Nursing Students.

Introduction

Universities and educational institutions are expected moreover to transmit educational concepts, skills and knowledge related to the academic discipline to the students, but also should facilitate life-long learning (Price, Becker, Clark, Collins,2011; Aazami, Khjouei, and Rakhshani,2016). Nowadays the students of nursing graduate education that are simultaneously working in hospitals and training centers need to obtain skills for utilizing new and up to date data and information. It is obvious that such data, themselves, are not considered as knowledge and should pass through the stages of gathering, study, arrangement, question, thought, judgment, edition, integration, analysis and evaluation, before becoming knowledge. Implementing such a process requires specific literacy and otherwise, information remains as events (Gonen, Sharon, Offir, Lev-Ari, 2014).
Nurses as persons who need widespread analysis and utilization of the information to better service delivery to the patients should enjoy extensive information literacy (Jenkins, Parylo, 2011). In this regard, the nursing curriculum should be updated in order to emphasis on different nurses' skills. In this way, not only the curriculum provides the nurses accessibility to the needing information, but also through critical thinking provide the relation between the evidences and the reality (Ozbicakci, Gezer, Bilik, 2015). Because nurses comprise the largest group of medical services providers and have fundamental role in continuing care, improving and maintaining health, so the experts and specialists of this major require new and up to date information for implementing clinical measures such as prevention, treatment and caring for patients (Ku, Sheu, Kuo, 2007).

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There are various definitions for information literacy between studies. Common characteristics of definitions is that information literacy is the ability to select, simplify, unite, present, publish apply and interpret information and scientific databases, and lastly solve the related problems (Malekzadeh, Azami, Mirzaei, and Motamedi,2016; Verhey,1999). Students who have self-efficacy in information literacy have higher motivation and academic achievements (Ross, Perkins, Bodey,2016).

Self-efficacy provides motivation and self-confidence for the individuals so they can effectively solve the problems. Self-efficacy is beyond human capabilities and is independent predictor for students' capabilities. A person capabilities solely is not an indicator of he/she interest and motivation toward learning, but self-efficacy has such abilities. Self-efficacy is not about the number of skills but is related to the things that a person can do in different situations (Bandura,2015). About the positive impact of information literacy on self-efficacy, it has been proven that students with previous experience on different aspects of information literacy such as research activities have lower uncertainty and self-confidence (Azami, Amini, Moosavi, Ahmadi,2018).

Identifying and determining the extent of information literacy of the nursing students, considering the trainings provided in the university, appears to be a necessity. In spite of the importance of information literacy and self-efficacy, but there are very few studies in this regard amongst Iranian students specially nursing students. The purpose of this research is to study the effect of information literacy on the level of self-efficacy per gender and educational sub-ordinates.

Research Method

Sampling

This is a practical semi-experimental study with pre and post-test on the study group followed up with control group. The study population was comprised of nursing graduate students (150 individuals) studying at the Nursing and Midwifery Faculty of Kerman University of Medical Sciences. Using regular random sampling method, 65 students were selected, 35 were placed in the test group and 30 were placed in the control group.

Intervention

After the permission granted by the faculty and upon grouping the students, pre-test questionnaire was conducted on both groups. The test group was then exposed to the independent variable (information literacy training). These trainings were comprised of information need, problem/ question formulation, positioning, information recovery, evaluation and effective utilization of the recovered information, information documentation, producing and promoting new information through searching the scientific databases and electronic resources in the field of medicine and nursing, which these trainings were held during 8 sessions, each lasting g 1.5 hrs. The time period between pre and post-test was 2 months.

Questionnaire characteristics

The tool used for gathering information was questionnaire, which comprised of three parts. The first part comprised of demographic information of the nursing students including age, gender, marital status, semester and average grade. The second part of the questionnaire was designed for evaluating the information literacy skills of the students and comprised of 24 questions which included the aspects for identifying information need, problem/question formulation, information positioning, information recovery, information utilization, information documentation, producing and promoting new information. The third part was corresponding to self-efficacy which comprised of 27 questions covering the aspects of successful experiences, successive experiences, verbal encouragement, emotional-physiological states, self-regulation, self-leadership and self-confidence.

Analysis

The data obtained from the questionnaires were analyzed with frequency tables, columnar graphs and calculation of central indicators such as mean and standard deviation. Based on Likert scale, the scores of 1 to 6 were dedicated to each question and then the average score was calculated for each of the questions and eventually the mean of the aspects was determined. Repeated measure ANOVA used to analyze the relationship between the study components through SPSS software.

Research Findings

The Extent of information literacy of the studied students prior to and after training

On the basis of two way mixed variance analysis, there was a significant statistical difference between the total score of information literacy and its components, prior to and after training among studied groups (P=0.001, p<0.001). Such that upon looking to the means of the scores prior to and after training for both groups, it is evident that the mean of scores in the training group from pre-test to post-test had a considerable increase for all components of information literacy comparing to the control group (Table 1).

Table 1- Mean and standard deviation of information literacy and its components for the studied groups

Variable	Group		Mean	Standard Deviation	F	P
Capability of Identifying Information Need	Pre-Training	Training	4.11	1.18	4.47	0.038
		Control	3.27	1.17		
	Post-Training	Training	5.34	0.76		
		Control	3.63	1.58		
Problem/Question Formulation	Pre-Training	Training	12.2	2.85	18.28	P=0.001
		Control	10.07	2.39		
	Post-Training	Training	15.74	1.61		
		Control	10.1	2.86		
Information Positioning	Pre-Training	Training	16.29	4.12	2.48	P=0.001
		Control	13.87	3.78		
	Post-Training	Training	20.71	2.39		
		Control	13.17	3.36		
Information Recovery	Pre-Training	Training	10.77	3.71	37.68	P=0.001
		Control	10.47	2.68		
	Post-Training	Training	15.54	2.16		
		Control	9.37	2.67		
Information Evaluation	Pre-Training	Training	11.11	3.53	18.86	P=0.001
		Control	9.87	2.73		
	Post-Training	Training	15.17	2.13		
		Control	9.57	3.31		
Information Utilization	Pre-Training	Training	11.8	3.02	25.47	P=0.001
		Control	10.5	2.5		
	Post-Training	Training	15.37	1.94		
		Control	10.2	2.45		
Information Documentation	Pre-Training	Training	12.06	2.61	21.66	P=0.001
		Control	10	3.32		
	Post-Training	Training	15.77	1.61		
		Control	9.14	2.51		
Producing Information	Pre-Training	Training	7.83	2.06	3.25	0.076
		Control	6.67	1.98		
	Post-Training	Training	8.09	2.34		
		Control	6.67	1.98		
Promoting Information	Pre-Training	Training	7.86	2.52	26.81	P=0.001
		Control	6.8	1.99		
	Post-Training	Training	10.43	1.53		
		Control	6	2.03		
Total Score of Information Literacy	Pre-Training	Training	94.57	20.63	36.3	P=0.001
		Control	82.21	17.6		
	Post-Training	Training	121.91	12.89		
		Control	77.62	15.6		

Frequency distribution of the studied samples based on demographic variables (age, gender, educational sub-orientation):

The mean age of the samples participated in training group was 32.4±5.4 and the mean age of the samples participated in control group was 29.83±3.82.
Regarding frequency distribution of the studied samples based on the variable of educational sub-ordinate, as Table 4-3 demonstrates, 26.6% (17 students) were studying the Internal-Surgical Nursing subordinate, 23.1% (15 students) were studying the Psychiatric Nursing subordinate, 21.5% (14 students) were studying the Elderly Intensive Care subordinate, 15.4% (10 students) were studying the Neonatal Intensive Care (NICU) subordinate, and finally, 13.8% (9 students) were studying the Community Health sub-ordinate.

Rregarding distribution of the studied samples based on the variable of gender, as demonstrated in Table 4-4, 69.2% (45 participants) were female and 3.8 (20 participants) were male.

The initial mean of self-efficacy and its components in studied groups

Mean distribution of the scores of self-efficacy and its components within the initial evaluation (prior to information literacy skills training) were almost at a same level for both studied groups and only a little difference was observed in the mean of the scores of the groups concerning the variable of self-efficacy and its components (Table 2).

Table 2- Mean and Standard Deviation of Self-Efficacy and its Components in the Studied Groups

Variable	Group	Number	Mean	Standard Deviation
Successful Experiences	Training	35	17.57	3.64
	Control	30	17.40	3.79
Successive Experiences	Training	35	17.86	4.45
	Control	30	17.43	4.42
Emotional-Physiological States	Training	35	7.83	2.05
	Control	30	7.54	2.09
Self-Leadership	Training	35	11.46	2.98
	Control	30	11.69	2.99
Self-Regulation	Training	35	6.91	2.5
	Control	30	7.26	2.59
Self-Confidence	Training	35	19.49	4.45
	Control	30	16.23	3.52
Verbal Encouragement	Training	35	11.26	2.75
	Control	30	10.69	2.84
Self-Stimulating	Training	35	12.8	2.7
	Control	30	11.66	3.11
Total Score of Self-Efficacy	Training	35	105.17	19.47
	Control	30	99.89	18.5

The difference of the level of information literacy among nursing students based on gender and educational sub-ordinates was demonstrated by non-parametric chi square test. Accordingly, there was a significant difference between studying sub-ordinates in terms of the information literacy variable, which such significance was confirmed at the level of two domains (p=0.055). Thereby research hypothesis (H_1) was confirmed in this variable and statistical hypothesis (H_0) was rejected. Further there was no significant difference between gender groups in the variable of information literacy (p=0.211). Thereby hypothesis (H_1) was rejected in this regard and statistical hypothesis (H_0) was confirmed (Table 3).

Table 3- Difference of information literacy level among the studied samples based on gender and educational sub-ordinates using chi square significance indicator

Variable \ Information Literacy		Poor		Medium		Desirable		Likelihood	Df	P
		Number	Percentage	Number	Percentage	Number	Percentage			
Gender	Female	8	12.85	30	45.71	7	11.42	3.11	2	0.211
	Male	7	10	8	12.85	5	7.14			
Educational Subordinate	Psychiatric Nursing	1	1.42	9	12.85	5	7.14	15.22	8	0.055
	Elderly Intensive Care	5	7.14	5	7.14	4	5.71			
	Internal-Surgical	-	-	17	24.28	-	-			

	Community Health	3	4.28	5	7.14	1	1.42			
	Neonatal Intensive Care	3	4.28	5	7.14	2	2.85			

***** There was a significant difference between the level of self-efficacy among the studied samples based on gender and educational subordinates.

The difference of self-efficacy levels among nursing students based on gender and educational subordinates was analyzed by nonparametric Chi square test. Accordingly, there was a significant difference between male and female gender groups (p=0.006) and also between the education sub-ordinate groups (p=0.014) in self-efficacy variable at the level of two domains (P=0.001). Thereby research hypothesis (H1) was confirmed for both and statistical hypothesis (H0) was rejected. Therefore, it could be concluded that self-efficacy variable, under the influence of gender and educational subordinates, have a considerable difference (Table 4).

Table 4- The difference of self-efficacy level among the studied samples based on gender and educational Sub-ordinate using chi square significance indicator

Variable \ Information Literacy		Poor		Medium		Desirable		Likelihood	Df	P
		Number	Percentage	Number	Percentage	Number	Percentage			
Gender	Female	3	5.71	34	51.42	8	12.85	10.27	2	0.006
	Male	8	11.42	8	11.42	4	7.14			
Educational Subordinate	Psychiatric Nursing	-	-	12	17.14	3	4.28	19.14	8	0.014
	Elderly Intensive Care	5	7.14	5	7.14	4	5.71			
	Internal-Surgical	2	2.85	13	18.57	2	2.85			
	Community Health	2	2.85	6	8.57	1	1.42			
	Neonatal Intensive Care	-	-	8	11.42	2	2.85			

* Information literacy variable and its components have high prediction power over self-efficacy variable.

Linear regression method with the technique of simultaneously entering variables (Enter) was used in order to calculate the prediction power of information literacy over the total score obtained from self-efficacy scale. As Table 4-8 demonstrate, the results obtained from calculating regression predicting the information literacy over self-efficacy, indicate a significant statistical relationship, which such significance is confirmed at confidence level of 95% (r=0.814, r^2=0.662, f=133.31 and p<0.001). Therefore, direction and prediction power of information literacy over self-efficacy was analyzed at the following stage.

On the basis of obtained βvalue, strong and direct prediction power of information literacy over the total score obtained from self-efficacy scale is evident (β= 0.814, t=11.45 and P=0.001). Thereby research hypothesis (H_1) was confirmed and statistical hypothesis (H_0) was rejected. In the next stage, variance of prediction power of these variables are analyzed and addressed using a step by step multivariate regression with the technique of simultaneously entering variables (stepwise) (table 5).

Table 5- Value of the predictable variance, step by step, using the components of information literacy for predicting self-efficacy (only significant variables are provided in the model)

Variance predictive variable	R	R^2	Value of F	P
Information positioning	0.792	0.624	112.94	P=0.001
Information positioning and information documentation	0.847	0.718	85.23	P=0.001
Information positioning, information documentation and information utilization	0.872	0.761	69.87	P=0.001
Information documentation and information utilization	0.867	0.752	101.72	P=0.001

As Table 5 indicates, at the first step “Information Positioning” variable is capable of predicting 0.792 of variance of self-efficacy. Upon adding two other variables, namely “Information Documentation” and “Information utilization” within steps two and three, this value increased to 0.847 and 0.872, respectively. In the end and at the last step, adding two variables of “Information Documentation” and “Information utilization” simultaneously could predict 0.867 of the variance of self-efficacy variable (p<0.001). Therefore, research hypothesis (H1) was confirmed and statistical hypothesis (H0) was rejected for these components. Among other components of information literacy, however, there was no significant predictive variance. Thereby, at the next stage and for the purpose of determining the direction and prediction power, step by step regression coefficients for these variables were calculated (Table 6).

Table 6- Different regression models with step by step increase of the variables for calculating prediction power of the variables capable of predicting self-efficacy

Steps	Variable	B	β	T	P
First	Information Positioning	4.23	0.790	10.62	P=0.001
Second	Information Positioning	2.61	0.489	5.36	P=0.001
	Information Documentation	3.08	0.430	4.71	P=0.001
Third	Information Positioning	0.991	0.185	1.51	0.136
	Information Documentation	3.11	0.433	5.12	P=0.001
	Information Utilization	2.63	0.365	3.43	P=0.001
Forth	Information Documentation	3.56	0.497	6.69	P=0.001
	Information Utilization	3.47	0.481	6.68	P=0.001

As table 6 indicates, it is found that within the first and second steps, the highest prediction power belongs to Information Positioning ($P<0.001$, $t=10.62$ and $\beta=0.790$) and ($P<0.001$, $t=5.36$ and $\beta=0.489$). This component, in overall the model, has the strongest prediction power in comparison with other variables entered in the regression model.

The component of Information Documentation ($P<0.001$, $t= 5.12$ and $\beta=0.433$) and ($P<0.001$, $t= 6.69$ and $\beta=0.497$) has also a high and direct prediction power in the third and fourth steps ($P <0.001$). The component of Information Utilization, in the next rank, has a strong and direct prediction power. Therefore, research hypothesis (H_1) was confirmed and statistical hypothesis (H_0) was rejected for these components.

As table 6 indicates, there is a statistically significant difference between the total score of self-efficacy and its components, prior to and after training, among the studied groups, and such difference is confirmed at confidence level of 95% ($P<0.001$ and $P=0.001$). So that upon looking into the mean scores of the four groups (two pre-test groups and two post-test groups) it is found that the means of the training group from pre-test to post test for all components of Successful Experiences ($P<0.001$, $f= 22.43$), Successive Experiences ($P<0.001$, $f= 12.92$), Emotional-Physiological States ($P<0.001$, $f= 51.04$) ,Self- Leadership ($P<0.001$, $f= 47.77$), Self-Regulation ($P<0.001$, $f= 43.85$), Self Confidence ($P<0.001$, $f= 39.05$) , Verbal Encouragement ($P<0.001$, $f= 13.53$), Self-Stimulating ($P<0.001$, $f= 8$), and Total Score of Self-Efficacy ($P<0.001$, $f= 41.98$) displayed a more increase comparing to the control groups. Therefore, research hypothesis (H_1) was confirmed and statistical hypothesis (H_0) was rejected for all of these components (Table 7).

Table 7- Mean and standard deviation of self-efficacy and its components prior to and after training among studied groups

Variable	Group		Mean	Standard Deviation	f	P
Successful Experiences	Training	Pre-Training	17.57	3.64	22.43	P=0.001
		Post-Training	20.86	2.55		
	Control	Pre-Training	13.76	4.29		
		Post-Training	11.83	2.97		
Successive Experiences	Training	Pre-Training	21.86	4.45	12.92	P=0.001
		Post-Training	26.66	2.27		
	Control	Pre-Training	17.17	4.54		
		Post-Training	16.9	5.12		
Emotional-Physiological States	Training	Pre-Training	7.83	2.05	51.04	P=0.001
		Post-Training	10.6	1.35		
	Control	Pre-Training	6.77	1.92		
		Post-Training	5.47	2.11		
Self- Leadership	Training	Pre-Training	11.46	2.98	47.77	P=0.001
		Post-Training	15.11	2.05		
	Control	Pre-Training	9.6	2.9		
		Post-Training	8.03	2.32		
Self-Regulation	Training	Pre-Training	6.91	2.5	43.85	P=0.001
		Post-Training	10.09	1.7		
	Control	Pre-Training	6.27	2.13		
		Post-Training	5.63	1.54		
Self Confidence	Training	Pre-Training	19.49	4.45	39.05	P=0.001
		Post-Training	25.51	3.27		
	Control	Pre-Training	16.07	3.88		
		Post-Training	14.1	3.65		
Verbal Encouragement	Training	Pre-Training	13.26	2.75	13.53	

		Post-Training	15.97	1.5		P=0.001
	Control	Pre-Training	9.37	2.85		
		Post-Training	12.8	2.37		
Self-Stimulating	Training	Pre-Training	12.8	2.7	8	P=0.001
		Post-Training	16.03	1.74		
	Control	Pre-Training	10.1	2.96		
		Post-Training	10.77	3.44		
Total Score of Self-Efficacy	Training	Pre-Training	111.17	19.47	41.98	P=0.001
		Post-Training	140.83	13.09		
	Control	Pre-Training	89.17	21.25		
		Post-Training	81.79	16.54		

Discussion

As the results indicate, there is a significant statistical difference between the total score of information literacy and its components, among the studied groups, from before to after the training. So, it is expected that holding training courses and workshops for introducing the standards, issues and the terms of training for information literacy could have a significant role in improving and acquisition of information literacy among the students of Kerman University of Medical Sciences, which assist them for solving various problems.
Shorten et al. in their study assessed a program designed to strengthen university of Wollongong bachelor students' skills to use information and databases. They noticed that the mentioned program promotes information literacy skills of the students and their life-long learning and effective evidence based practice (Shorten , Wallace, Crookes,2001).

Other studies also indicate that training information literacy can improve students' capability in different aspects of information evaluation such as specifying needed journals and articles, selecting suitable search and MeSH terms and assessing journal websites (Shorten , Wallace, Crookes,2001; Motamedi, Azami, Malekzadeh, and Mirzaei,2016).

The results indicated that studied subjects had a moderate level of self-efficacy prior to training of information literacy. This finding is in consistency with the results of the study conducted by Askari-Zadeh Mahani et al. In their research, they indicated that most of the studied students, i.e. almost 84.8% of them, had moderate self-efficacy (Askaryzadeh, Soleimani, Zafarina, Miri,2016).
Many of the human behaviors are excited and controlled with self-influence mechanisms. Among such self-influence mechanisms, none is as important and comprehensive as self-efficacy beliefs. If an individual believes that he/she is incapable of achieving the expected results and or if believes that he/she cannot avoid unexpected behaviors, then his/her motivation for performing the task would be reduced. Although there are other factors that act as the motivators of human behaviors, but all of them are subject to the person beliefs (Bandura, Freeman, Lightsey,1999).

The performance and information knowledge of the students not only is under the influence of their information literacy, but also their self-efficacy beliefs and this relationship is bilateral. A study by Kurbanoglu at the department of information management Hacettepe, university of Ankara indicates that self-efficacy of students for information literacy and their self-efficacy for computer skills are positively correlated. This finding is in accordance with current study (Serap Kurbanoglu,2003).

The results of assessing the level of information literacy among the studied samples based on gender and educational subordinate indicate that there is a significant difference only in the variable of information literacy between sub-ordinate groups of psychiatric nursing, elderly intensive care, internal surgery, community health and neonatal intensive care.

About the relation between gender and self-efficacy amongst faculty members, Sharavan et al. indicated that gender is not the case and there is no significant difference in this regard between men and women. Also, they indicated that there is no significant difference between faculties with different degrees including lecturer, assistant, associate, and full professors (Demiralay, Karadeniz,2010).

The results indicated that there is a statistically significant difference between the total score of self-efficacy criterion and its components, before and after training among the studied groups. In other words, mean score of training group from pre-test to post-test in terms of all components of successful experiences, successive experiences, emotional-physiological states, self-regulation, self-leadership, self-belief, self-stimulating, self-confidence and the total score of self-efficacy had more increase comparing to the control group. Therefore, it is expected that information literacy training positively influences the improvement of self-efficacy skills and its components for the students. Other studies confirm these findings. For example, a study performed by Demialay and Karadeniz on 1801 student teachers on Turkey universities indicated that experience, skills, and use of computer and internet have outstanding effects on their self-efficacy (Demiralay, Karadeniz,2010).

Conclusion

Training information literacy skills for the students, would increase information positioning skills, familiarity with internet and databases and satisfying the information needs for them which led to their increased self-efficacy, in a way that such effect is evident in all aspects of their self-efficacy skills.

Furthermore, according to the results of this research, the variable of information literacy only had significant difference among the educational sub-ordinate groups. Self-efficacy variable, however, had significant differences both among the female and male gender groups, and among the educational subordinate groups. Thereby, it is apparent that in case authorities and practitioners of the post graduate education system pay more attention to holding trainings for information literacy skills based on gender and education sub-ordinates, then not only the learning depth of the graduates improves, but also they could prepare the grounds for strengthening their self-efficacy beliefs.

Considering the results of this research and for the purpose of developing information literacy skills and, as a result, improvement of self-efficacy skills of nursing students, the following points are proposed to the planners of the post graduate system:

1. To do their best work to prepare the grounds for optimal utilization of information resources.
2. Planners and professors in the classrooms should introduce research activities that require searching web, so that students become practically and directly familiar with information resources.
3. Professors shall utilize web-based educational systems in their teaching programs, and information literacy skills training workshops should be held for the purpose of empowering the information literacy skills of the students.
4. The effect of variables influencing information literacy, such as “learning methods; “ motivational factors” and etc. should be measured.
5. Studying the factors creating durability of information literacy training among nurses through a research project.
6. Studying the relationship of clinical skills of the nurses with their information literacy and electronic learning through a research project.

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