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Full Length Research Paper

The relationship between learning approaches of prospective teachers and their academic achievement

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To prepare for future professional challenges, prospective teachers should acquire the capabilities for independent learning. Prospective teachers should know how to learn effectively. In this article, prospective teachers' learning approaches, learning preference and the relationship between learning preference, learning approaches with achievement and students' perception of achievement were investigated. In order to determine the approach and study skills of students, Approaches and Study Skills Inventory for Students (ASSIST) was used. Findings indicated that academic achievement was positively related to strategic approaches, and perception of achievement was positively related to strategic approaches but negatively related to a surface approach to learning. There was a difference in using strategic approaches in favor of female students. There was a positive relationship between academic achievement and strategic approach. However, no correlation was found between academic achievement and surface approach. Strategic approaches to learning were found to be the best predictors of academic performance in the present study. Students' satisfaction with their major was positively correlated with strategic approaches but negatively related to surface approaches and deep approaches.

Key words: prospective teachers, learning approaches, higher education, ASSIST.

INTRODUCTION

Many studies in the field of learning have been prompted by the desire to understand why some students learn better than others. A key concept focus on this problem is learning approaches which arises from the early research of Marton and Säljö (1976a, b). Learning approaches can be defined as the intentions and motives a student has in undertaking a learning task, as well as the corresponding strategies by which these intentions and motives are accomplished (Diseth, 2007).

Learning approaches of students depend on a number of factors. Some of these factors are contextual. The contextual factors include teaching methods, teaching design, assessment of students' learning, and the way

the curriculum is organised (Pimparyon et al., 2000; Entwistle and McCune, 2004). Personal factors such as student's sex, age, and previous experiences may also have an effect on how students approach their learning and studying. It is also reported that students' learning approaches are dynamic and amenable to change with student perception of the learning context, task difficulty, and associated workload demands (Zeegers, 2001).

Initially, two approaches of learning have been identified: deep and surface approaches (Marton and Saljö, 1976a, b; Biggs, 1999). Deep approach to learning involves the intention to understand while the surface approach to learning describes the intention to reproduce information in compliance with externally imposed task demands. Deep learning is more likely to result in better retention and transfer of knowledge and lead to higher-quality learning outcomes (Ramsden, 1992; Biggs, 1999).

In contrast, surface approach is characterized by a lack

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of personal engagement in the learning process. A student with a surface approach has the intention to reproduce the learning material and the motive to avoid failure by means of rote learning (memorizing) (Diseth, 2007). Because previous research drew attention to the pervasive influence of assessment on student learning, an additional approach was identified: strategic approach (Entwistle and McCune, 2004). This approach describes the intentions and activities of students who are primarily focused on achieving the highest possible grades by organization of time and the learning environment. They use any strategy in order to rote memorize lots of facts or understand basic principles, which they perceived would maximize their chances of academic success (Watkins, 2000).

The theory proposed that surface approaches to learning lead to lower-quality learning outcomes (Marton and Saljo, 1976a, b). As regards the relationship between approaches to learning and academic achievement, typically, positive correlations between strategic approaches and achievement, and negative correlations between surface approaches and achievement have been found (Diseth and Martinsen, 2003). However, research since then has reported somewhat mixed results for the relationship between deep and surface processing and academic performance, but tends to show a positive relationship for deep processing and null results for surface processing (Roman et al., 2008).

To be able to adapt to the changes in the future, prospective teachers should acquire the capabilities of independent learning. Good teaching may be enhanced by considering aspects of learning environments that are aligned to deep approaches to learning. Prospective teachers are required to develop an understanding of a fast-changing knowledge base, and also a wide range of competencies, such as problem-solving and analytical skills, which will foster lifelong learning.

An early study about learning approaches of prospective teachers in Turkey was established by Senemoğlu (2011). She adopted Approaches and Study Skills Inventory for Students (ASSIST) into Turkish and found that most prospective teachers prefer deep and strategic approaches to learning and reported that the use of deep approach inclined as the year of study increased. She also found that prospective teachers in humanities preferred deep approach more than the students in early childhood and math and science.

To extend our understanding of prospective teachers' learning approaches in our culture we further investigate learning preference of prospective teachers' and the relationship between learning preference, learning approaches with achievement and students' perception of achievement. An understanding of how learning approaches of students relate to learning may help teachers and curriculum developers to review their instructional methods and curriculum in order to foster future teachers and future education. Specifically, we addressed the

following research questions:

1. What is the learning profile of prospective teachers in relation to gender and major?
2. What is the relationship between prospective teachers' learning approaches, their views about learning and their preference of learning?
3. To what extent do prospective teachers' learning approaches predict their academic achievement?
4. To what extent do prospective teachers' learning approaches predict their perception of achievement?

METHOD

Subjects

We gathered data from 284 sophomores of Hacettepe University, Faculty of Education who volunteered to participate in this study. Their major fields of study were early childhood education (8.1%), elementary education (36.6%), secondary education-math (11.3%), secondary education-science (10.6%) language education-German (12.0%), language education-English (7.0%) and technology education (14.4%). Seventy-four percent of the students were female.

Instrument

In order to determine the approach and study skills of students, we used Approaches and Study Skills Inventory for Students (ASSIST) that was developed by Tait et al. (1998). The inventory contains 67 statements, rated on a five-point Likert scale. ASSIST consists of four sections:

- (i) The first section is a six-item measurement of the student's own conception of what the term "learning" means to them.
- (ii) The second section consists of 52 statements related to mainly three dimensions - deep, strategic, and surface-apatetic. Each approach has four or five subscales comprises four items.
- (iii) The third section of ASSIST is an eight-item questionnaire measuring preferences for different types of teaching- lectures, courses, exams and books.
- (iv) In the fourth section, the students are asked how well they think regarding the overall performance assessed.

The scores for the scales were calculated by summing the scores of the relevant items. The ASSIST was previously adapted to Turkish and was administered to students in teacher education in Turkey (Senemoğlu, 2011). It is reported that Turkish version of ASSIST scales and subscales have internal consistency reliability varying from acceptable to high, and satisfactory and very good fit construct validity. In Senemoğlu's study the Turkish version of ASSIST was examined by confirmatory factor analysis. She reported that the data obtained from Turkish version ($n=806$) produced a satisfactory fit to the model of structure of whole inventory, since the good fit indices values are $CFI=0.91$, $NNFI=0.91$ greater than 0.90 and $RMSEA$ less than 0.05. The alpha values reported for the main scales range from 0.71 to 0.81 (Senemoğlu, 2011). We calculated alpha values for the main scales ranging from 0.76 to 0.87 in our study. These values are satisfactory and comparable to those reported in the original study of ASSIST (Tait et al., 1998).

We also asked students their order of university choice at the National University Placement Examination and also they ranked their satisfaction of their major on a five point Likert scale.

Implementation of the study

We asked students to complete the questionnaire in the 8th week of the first semester during the Principles of Learning and Instructions Course. We explained the aim of study to the students and asked them to read and sign the informed consent form if they accepted to participate. At the end of the semester (14th week), we obtained students achievement score from students office with the permission of the Dean of Faculty of Education.

Data analysis

We calculated mean scores and standard deviations of the subscales. We compared ASSIST scores according to students' major subjects with one-way variance analysis. We calculated correlation coefficient and analyzed the relationship between the ASSIST scores and the students' achievement and perception of achievement with multi-linear regression analysis. We investigated the assumptions of the multi-linear regression analysis before performing the analysis. We examined all variables included in these models for multicollinearity through variance inflation factor (VIF) assessment. Tolerance values were higher than 0.10. Durbin-Watson autocorrelation statistics were generated to identify models with serial autocorrelation. Since Durbin-Watson value was between 1.5 and 2.5 ($d=1.98$), there was no autocorrelation (Norman and Streiner, 2008).

RESULTS

The mean score of prospective teachers was 58.18 in deep approach subscale, 72.63 in strategic approach and 46.23 in surface approach subscale. Since the expected mean value was 50 for deep and surface, and 62.5 for strategic approach subscale, it can be said that prospective teachers in our study used deep and strategic approaches more than surface approaches.

We compared prospective teachers' learning approaches according to their gender and found a difference in using strategic approaches in favor of female students ($p=0.01$). The mean score of deep and surface approaches were not different according to gender. And also the mean score of subscales of learning approaches were not different according to major (Table 1).

We asked prospective teachers their satisfaction about their major. Most of them (64.2%) reported that they were satisfied, 20% of them reported that they were neither satisfied nor dissatisfied, only 15.7% of them stated that they were not satisfied with their major (data not tabled).

Prospective teachers rated their perceptions about their achievement in the scale. 5.7% of them rated their achievement excellent, 49% of them rated very good, 38.9% of them rated average, 4.2% of them rated below the average and 1.5% of them rated poor (data not tabled).

We asked prospective teachers the order of their university choices at the National University Placement Exam. They reported that 27.7% of them chose their current major as their first choice, 16.6% as their second, 13.2% as their third, 12.3% as their fourth, 4.7% as their fifth and others were upper than 6th place (data not

tabled).

We found that prospective teachers' satisfaction level with their major was positively correlated with strategic approaches but negatively related to surface approaches. Satisfaction was also moderately related to the order of university choice.

We found positive relationship between achievement and strategic approach score ($r=0.23$ for the first semester average, $r=0.25$ for academic average), however there was no correlation between surface approach score. There was very low correlation between the first semester average and deep approach score.

Prospective teachers' perceptions of achievement were positively related to strategic approach, and negatively related to surface approaches. There was low positive correlation with deep approach (Table 2).

Prospective teachers' perceptions of achievement were positively correlated with satisfaction ($r=0.25$) and achievement ($r=0.25$ for first semester average, $r=0.26$ for academic average). We also found low but significant correlation between satisfaction and achievement ($r=0.25$ for the first semester's average, $r=0.26$ for academic average). The result of regression analysis confirmed these relationships.

The sub-dimensions of ASSIST score indicated a weak but meaningful relationship with the first semester average ($R=0.24$, $R^2=0.06$, $p<0.01$) and with the academic average ($R=0.27$, $R^2=0.07$, $p<0.01$), but more strong relationship with the perception of achievement ($R=0.47$, $R^2=0.22$, $p<0.01$). According to the standardized regression coefficients, the most important sub-dimensions relative to achievement and perception of achievement score were strategic approach. Surface approaches were negative predictor of perception of achievement (Table 3).

In ASSIST, items 53 to 58 investigated prospective teachers' views about learning, and items 59 to 66 investigated their preference of different types of teaching in the scale (Tables 4 and 5). Item 53 "making sure you remember things well" implied precedence of memorizing in learning. 76% of prospective teachers rated 4 or 5 in this item. But more than 80% of prospective teachers rated 4 or 5 for items 54 to 58 which indicated constructivist explanation of knowledge. Surface approaches were not related (item 55, item 56) or negatively related (item 54, item 57 and item 58) to these items' score, but deep and strategic approaches were positively related. Unexpectedly item 53 was not related to surface approach but positively related to deep and strategic approaches' score.

Item 59 and 60 were about different types of lecturers. Deep and strategic approaches were related to item 60, which explain the preference of constructive type of lecturer. Item 61 and 62 were about exams. As expected, item 61 correlated with deep and strategic approach and item 62 with surface approach. Item 63 and 64 were about courses. Item 63 was not related to deep approach but there was low correlation between this item's score

Table 1. ASSIST mean scores of prospective teachers according to gender and major.

	Deep approach		Strategic approach		Surface apathetic approach	
	Mean	SD	Mean	SD	Mean	SD
Total	58.13	8.59	72.63	11.50	46.23	9.06
Gender						
Female (n=200)	58.51	8.55	73.91	11.33	45.88	8.98
Male (n=84)	57.23	8.67	69.58	11.41	47.08	9.25
t	1.14		2.93		-1.03	
p	>005		0.01		>005	
Major						
Technology (1.00) (n=41)	58.56	7.69	72.54	9.27	48.05	10.16
Elementary (n=104)	56.51	8.69	70.61	10.85	46.85	9.44
Science (n=30)	61.13	6.75	76.53	9.50	43.87	7.53
Early childhood (n=23)	60.69	9.34	74.17	12.34	47.70	8.01
English (n=20)	59.80	8.99	75.70	10.64	45.15	10.03
German (n=34)	58.44	8.58	74.32	12.56	46.88	8.44
Math (n=32)	56.78	9.37	70.84	15.29	43.06	7.74
F	1.89		1.70		1.54	
p	>005		>005		>005	

and strategic and surface approaches. Expectedly, item 64 was negatively correlated with surface but positively correlated with deep and strategic approaches. Items 65 and 66 were about books. There were no relationship between item 65 and learning approaches; however there was a relationship between item 66 and surface approaches.

DISCUSSION AND CONCLUSION

There are relationships between the learning approach adopted and the quality of the learning outcome achieved, in that deep approaches to learning as opposed to surface approaches are associated with high-quality outcomes (Byrne, 2010). When we looked at the findings of our study, we found that students used strategic and deep approaches more than surface approaches. Chan (2003) and Senemoğlu (2011) also studied learning approaches and reported that prospective teachers used deep approach most, followed by surface approaches.

We found a difference in using strategic approaches in favor of female students ($p=0.01$). Similarly Senemoğlu (2011) stated that female students scored higher in strategic and surface approaches. As she explained, Turkish female students are much more motivated for achievement than male students, organizing their studies, monitoring their understandings and managing their time.

It was argued that the structure of a curriculum and the demands of a summative assessment exert a strong influence on approaches to learning. Summative assessment in higher education usually encourages a strategic

approach where students combine deep and surface approaches in order to achieve the best possible marks (Entwistle and McCune, 2004). Students are more likely to adopt surface approaches whenever the workload is perceived as too heavy and whenever the assessment demands encourage the reproduction of facts, rather than the understanding of meaning (Diseth, 2007; Byrne, 2010). It can be expected that our students, particularly girls, used strategic approaches as the assessment methods at the Education Faculty are based on summative assessment mostly.

As Bernardo (2003) stated, many intricately interacting variables determines whether a student succeeds in school. One variable that has been the focus of research in recent years refers to the way students do their learning tasks. Approaches to learning have been shown to be an important predictor of academic achievement (Diseth and Martinsen, 2003; Roman et al., 2008; Duff, 2004; Pimparyon et al., 2000). Deep and achieving motives were reported to be positively correlated with academic achievement (Bernardo, 2003). Diseth and Martinsen (2003) stated positive relationship between strategic approach and academic performance, and negative relationship between surface approach and performance. In line with this, we found a positive relationship between academic achievement and strategic approach and, however no correlation between academic achievement and surface approach. Strategic approaches to learning were the best predictors of academic performance in the present study (Table 3). As we expected, students' perceptions of achievement were also related to strategic approach positively, but related

Table 2. Correlation coefficients between subscales of ASSIST achievement score of prospective teachers and perception of achievement.

	Deep	Strategic	Surface	Preference rank	Satisfaction	Perception of achievement	First semester average
Strategic	0.63(**) 0.00 284						
Surface	-0.03 0.58 284	-0.16(**) 0.01 284					
Preference rank	0.01 0.86 235	-0.09 0.16 235	-0.00 0.97 235				
Satisfaction	0.05 0.43 235	0.31(**) 0.00 235	-0.31(**) 0.00 235	-0.33(**) 0.00 229			
Perception of achievement	0.14(*) 0.02 265	0.39(**) 0.00 265	-0.29(**) 0.00 265	-0.03 0.66 218	0.25(**) 0.00 217		
First semester average	0.16(*) 0.03 200	0.23(**) 0.01 200	-0.09 0.21 200	0.17(*) 0.03 157	0.18(*) 0.03 155	0.25(**) 0.01 184	
Academic average	0.10 0.18 200	0.25(**) 0.00 200	-1.11 0.12 200	0.06 0.50 157	0.20(*) 0.02 155	0.26(**) 0.00 184	0.88(**) 0.00 200

Pearson correlation, significance level, number of students accordingly. *p<0.05 and **p<0.01

Table 3. The regression analysis results for prospective teachers' achievement and perception of their achievement score.

	B	Std. error	b	t	p	Zero-order r	Partial r
First semester average							
Constant	1.81	0.43		4.16	0.00		
Deep approach	0.00	0.01	0.03	0.32	0.75	0.16	0.02
Strategic approach	0.01	0.01	0.20	2.28	0.02	0.23	0.16
Surface approach	-0.01	0.01	-0.07	-0.94	0.35	-0.09	0.08
R=0.24	R ² =0.06	F=3.96	p<0.01				
Academic average							
Constant	2.22	0.31		7.12	0.00		
Deep approach	-0.01	0.01	-0.09	-1.03	0.31	0.10	-0.07
Strategic approach	0.01	0.01	0.30	3.34	0.00	0.25	0.23
Surface approach	-0.01	0.01	-0.08	-1.12	0.26	-0.11	-0.08
R=0.27	R ² =0.07	F=5.23	p<0.01				
Perception of academic achievement							
Constant	3.07	0.38		8.20	0.00		
Deep approach	-0.01	0.01	-0.146	-2.10	0.04	0.14	-0.13
Strategic approach	0.03	0.01	0.446	6.31	0.00	0.39	0.36
Surface approach	-0.02	0.01	-0.226	-4.08	0.00	-0.29	-0.25
R=0.47	R ² =0.22	F=24.67	p<0.01				

Table 4. Prospective teachers views about learning and preference of different types of teaching.

	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
Views about learning*										
53. Making sure you remember things well	7	2.5	8	2.8	53	18.7	158	55.6	58	20.4
54. Developing as a person	5	1.8	18	6.3	35	12.3	115	40.5	111	39.1
55. Building up knowledge by acquiring facts and information	1	0.4	7	2.5	49	17.3	130	45.8	97	34.2
56. Being able to use the information you've acquired	1	0.4	8	2.8	24	8.5	87	30.6	164	57.7
57. Understanding new material for yourself	-	-	6	2.1	22	7.7	102	35.9	154	54.2
58. Seeing things in a different and more meaningful way	6	2.1	6	2.1	46	16.2	103	36.3	123	43.3
Preference of different types of teaching**										
59. Lecturers who tell us exactly what to put down in our notes	10	3.5	26	9.2	16	5.6	114	40.1	118	41.5
60. Lecturers who encourage us to think for ourselves and show us how they themselves think	2	0.7	9	3.2	12	4.2	105	37.0	156	54.9
61. Exams which allow me to show that i've thought about the course material for myself	3	1.1	7	2.5	21	7.4	103	36.3	150	52.8
62. Exams or tests which need only the material provided in our lecture notes	43	15.1	76	26.8	58	20.4	80	28.2	27	9.5
63. Courses in which it's made very clear just which books we have to read	16	5.6	30	10.6	50	17.6	106	37.3	82	28.9
64. Courses where we're encouraged to read around the subject a lot for ourselves	14	4.9	48	16.9	54	19.0	91	32.0	77	27.1
65. Books which challenge you and provide explanations which go beyond the lectures	61	21.5	68	23.9	52	18.3	67	23.6	36	12.7
66. Books which give you definite facts and information which can easily be learned	2	0.7	12	4.2	19	6.7	100	35.2	151	53.2

*1=Very different; 2=Rather different; 3=Not so close; 4=Quite close; 5=Very close.

**1=Definitely dislike; 2=Dislike to some extent; 3=Unsure; 4=Like to some extent; 5=Means definitely like.

to surface approaches negatively in the study (Table 3). It was asserted that deep approaches are more likely to relate to academic success in the later years of a degree course and when the assessment procedure directly rewards a demonstration of conceptual understanding, but a combination of surface and strategic approaches may be adaptive for undergraduate science students (Diseth and Martinsen, 2003).

We also asked students their order of university choices at the National University Placement Examination and their satisfaction with their major as an indicator of their motivation. We think that students who preferred their major as their first choice and who are satisfied with it are more

motivated to study to become teachers. We expected that highly motivated students would use deep approaches more often and surface approaches less. We found that students' satisfaction with their major was positively correlated with strategic approaches but negatively related to surface approaches and found no relationship with deep approaches. Satisfaction was also moderately related to the order of university choice. These findings showed that students are motivated for achievement rather than learning deeply even when they are satisfied with their major. Besides we did not find a relationship between leaning approaches subscales and the order of university choice.

It is seen that deep and strategic approaches are positively related to the transfer of knowledge. According to this idea, a person can make sure that he can remember things well or can use the information he has acquired. In other words we can say that when students use deep approaches they learn more meaningfully. When we analyzed prospective teachers' views about learning, we found that they preferred constructive views of knowledge more frequently. The items indicating constructive views of knowledge (items 54 to 58) were negatively related or not related to surface approach. They all correlated with deep and strategic approach. Unexpectedly, we also found a relationship between deep and strategic

Table 5. Correlation coefficients between subscales of ASSIST achievement score of prospective teachers and perception of learning.

	Deep	Strategic	Surface
Views about learning			
53. Making sure you remember things well.	0.19(**)	0.19(**)	-0.02
54. Developing as a person.	0.27(**)	0.23(**)	-0.17(**)
55. Building up knowledge by acquiring facts and information.	0.19(**)	0.18(**)	-0.05
56. Being able to use the information you've acquired.	0.15(*)	0.13(*)	-0.07
57. Understanding new material for yourself.	0.26(**)	0.17(**)	-0.16(**)
58. Seeing things in a different and more meaningful way.	0.26(**)	0.16(**)	-0.13(*)
Preference of different types of teaching			
59. Lecturers who tell us exactly what to put down in our notes.	-0.07	0.09	0.04
60. Lecturers who encourage us to think for ourselves and show us how they themselves think	0.23(**)	0.16(**)	-0.10
61. Exams which allow me to show that I've thought about the course material for myself.	0.26(**)	0.12(*)	-0.11
62. Exams or tests which need only the material provided in our lecture notes.	-0.15(*)	0.04	0.18(**)
63. Courses in which it's made very clear just which books we have to read.	-0.00	0.13(*)	0.13(*)
64. Courses where we're encouraged to read around the subject a lot for ourselves.	0.31(**)	0.24(**)	-0.17(**)
65. Books which challenge you and provide explanations which go beyond the lectures.	0.11	0.06	-0.01
66. Books which give you definite facts and information which can easily be learned.	-0.05	-0.01	0.16(**)

**Correlation is significant at the 0.01 level.

*Correlation is significant at the 0.05 level.

approach with the item that explains rote memorizing (item 53). Cultural differences can be influential for this finding. Researches on learning approaches of Asian students reported similar results. Asian students use memorizing more than western students (Watkins, 2000). However, it was argued that there were two types of memorization, namely, memorization with understanding and mechanical memorization. They concluded that Asian students could perform better in their level of achievement than the western students because they had memorized with understanding (Wong, 2004). We do not have data regarding the usage of different memorization techniques of Turkish students. This issue could be further investigated.

In the way of preference of different types of teaching, we found that, in general, lectures, examination and courses which give precedence to active student participation to learning was positively related to deep and strategic learning. However, lectures, examinations and courses that prioritise transmission of knowledge and define in precise lines were related to surface approaches. In other words, students who used deep approaches preferred challenging lectures, exams and courses while students who used surface approaches preferred lectures, exams and courses that are defined and declared exactly.

In sum, we found that academic achievement is positively related to strategic approaches, and perception of achievement is positively related to strategic approaches but negatively related to a surface approach to learning. However, there may be sample-specific differences in these relationships. The relationship between

approaches to learning and academic achievement has proven to differ across contexts (Entwistle et al., 2000, in Diseth and Martinsen, 2003). We also found that students used different learning approaches and preferred different types of teaching. Approaches to learning are dynamic and sensitive to the learning context. To improve the quality of students' approaches to learning, it is suggested to determine students' perceptions of the assessment, their workload, teaching and the support they receive (Ramsden, 1992; Trigwell and Prosser, 1991, in Duff 2004). Consequently, to foster students' use of deep approach, more use of formative assessment and unseen problems in examination may be helpful. And more importantly, teachers have to put more effort in designing challenging course.

Clearly, the curriculum and the assessment process in the institution are among the key factors that affect the quality of student learning. Identifying the learning environment and understanding how students learn will help the teacher to facilitate learning and plan a curriculum to achieve the learning outcomes (Pimparyon et al., 2000). As Senemoğlu (2011) stated, investigating learning approaches and study skills of students in colleges of education is very important in order to see how well we educate our future teachers and to enhance teacher training programs as necessary. Studies that are designed to investigate the reasons for poor performance at universities can lead educators to think how to increase quality of learning outcomes by promoting deep learning through teaching-learning process and assessment procedures (Senemoğlu, 2011). Prospective teachers should know how they learn effectively. Here teacher- training

institutions play an important role, which is encouraging students to use their deep learning approaches.

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