

Effective Peer-learning Model for Students Using Neural Network

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Abstract: *In the face of the challenge of the dynamics of change, the requirements and the expectations from the professionals in the corporate world have changed drastically resulting in a huge requirement from schools to equip students with necessary skills, tools and techniques to enable them to be successful in life as well as in corporate world.*

Peer learning offers huge value-add to education received from classroom pedagogy. Considering the importance of peer-groups, they should not be left to function arbitrarily by placing students in random groups and asking them to 'work together'. A proper strategy can help to make this peer-learning most fruitful and meaningful.

In this paper, an effective strategy for efficient peer-learning is discussed with the help of example using neural network model. This paper proposes classification of various subjects under curriculum on the basis of skill set required by the students and forming peer-groups incorporating those diverse skills. The findings of the paper are quite relevant and motivating for educational institutions which aspire to produce successful future leaders in their respective fields.

Keywords: *Curriculum, Peer-learning, Neural network, Professionals, Pedagogy*

1. INTRODUCTION

Preparing students for the future life is very challenging and multifaceted task, even for the top-level schools. With the fast changing scenario of modern global business and cut-throat competition, the most critical issue for the schools are to teach all the required skills through classroom teaching. The schools are also faced with a tough task of teaching their students the art of learning and imbibing from peers even in future. Hence, each and every school is looking for new ways to help students equip with improved skills. The qualities, which are being looked for, are not only limited to knowledge, aptitude and academic intelligence but also extends to skills, attitude and emotional intelligence. People who lack such qualities are not likely to get success in life.

Unfortunately, most of the students do lack these qualities in some proportions. Learning process has been evolving since many centuries. Due to constant efforts from gurus, teachers, students and researchers, we have made a nearly robust learning system, which helps in overall development of the child since childhood.

However, due to the rapidly changing technological advancements and Economic turmoil there are many essential qualities which cannot be instilled theoretically. One needs to cultivate them practically through motivational grooming and peer learning. The current context of significant change in professional world has highlighted the need for better peer learning that can assist students to develop understanding and implementation of real life concepts.

Student peer learning is widely acknowledged as a vital component that will contribute to the effectiveness of any student. However, some characteristics of schools have presented particular challenges as they seek to further develop the quality of the peer learning opportunities that they provide. This paper reviews the characteristics of effective peer learning and outlines an effective method – its nature, focus and operation to implement it in any school.

Quality peer learning makes students to engage in interactive and collaborative activities with their peers; such environments have been shown to contribute to better learning outcomes, including development of higher order thinking skills, Co-creation of knowledge and meaning and Transformative learning. The environment might be simple—for example, one learner with one resource at home, work, or some other community space (Oldenburg 1999). The environment might be complex, such as several learners with many resources in a classroom, library, or cafe. Another type of environment might be a synchronous virtual meeting place, such as when several students collaborate online with many resources in different locations. The faculty member's involvement and presence can vary in any of these environments.

Blindly forcing the peer learning process by increasing group projects and activities does seem to help. However, following a proper process to inculcate maximum learning with the group stresses a lot on the strategy in forming these groups. One such strategy is the formation of the group consisting of members from diverse educational background; each one of the group members has some or the other expertise and group taken together covers maximum skills. In this way, each member gets a chance to learn in their lacking fields and could contribute to the group in their domain of expertise. This would facilitate a win-win situation for each and every group member. This paper studies the strategy for a group formation which maximizes the learning within the group and increase their chances of success in future life by equipping them with the necessary skills.

2. PURPOSE AND SCOPE

The purpose of this paper is to propose various strategies that will help in improving peer learning among students, maximizing chances of the individuals' success in this fast changing business environment. The paper focuses on exploring the various skills and features related to the concept in hand. The vital components related to the said concept have been explored with special reference to peer learning and preparing student for a better future life.

3. RESEARCH METHODOLOGY

In this study, various skills that students should have are analyzed in the context of Attitudinal, psychological, cognitive and people dimensions which are correlated with the professional qualities. The personal observations and insights have enormously formed the part of the study as the various connotations of the textual data have been interpreted and correlated with the topic in hand.

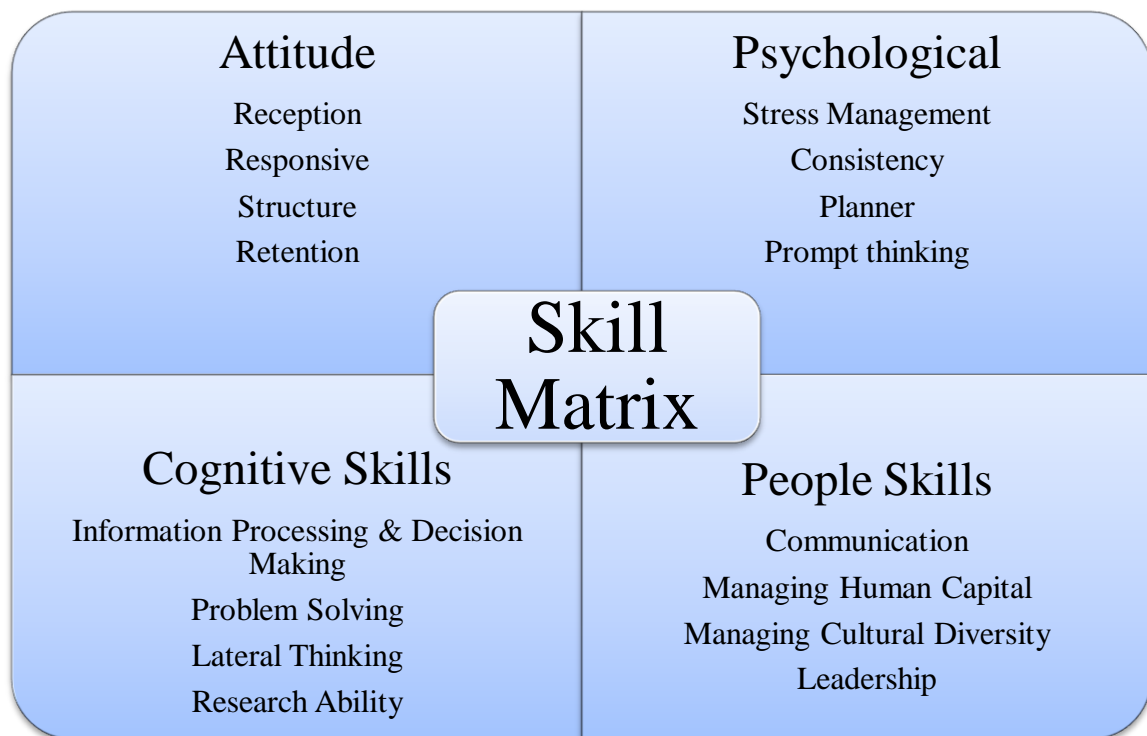
For first few years, data will be collected from the incoming batch of the students by giving them a test which will test them in each of the 4 dimensions and mark them dimensions wise. Then, store this data corresponding to the grades each student got during his previous studies. Using this data, we can train a neural network which will take inputs as the name of the subjects depending on the background of the student and outputs as the marks he got in each dimension. Finally, we will have a neural network trained for each of the previous disciplines a student might have come from.

This neural network will be further used to classify the students based on the previous marks they have secured and students containing diverse skill-set can be grouped together so as to benefit the whole group. Finally, neural network is trained by considering the response of the future batches. In few years, we will get a neural network which gives answer with more than 90% accuracy.



4. CHARACTERISTIC FEATURES OF THE CONCEPT

We have divided the skills as a ‘Skill Matrix’ consisting of major 4 dimensions – Attitude, psychological, cognitive and people dimensions.



Each of the 4 dimensions is defined as follows:

1) Attitude

a. **Reception:** Ability to receive the information with the minimum loss during the transmission of that information is very important and critical for right attitude of learning. The person with good deal of this skill are good observers, listeners and can understand and summarize the given topic easily.

b. **Responsive:** It helps students to create value for the class by responding well to the faculty’s discussion. Also, it brings out different perspective by students during discussion. The scope for this skill is not limited to the classroom learning. In business also, thinking on your feet is most sought after skill for negotiations and making deals between two parties. Individuals lacking this skill would not be able to communicate their ideas on impromptu basis during group discussion and brain- storming sessions.

c. **Structure:** Structure thinking helps in tackling macro level problems easily. It also helps students in terms of framing the answers in a better way. By structure thinking a student can divide the problem into small pieces and then can handle it. It also helps in planning for future, where people can plan much better with the same resources.

d. **Retention:** Retention as a skill helps in grasping the discussed or learned content. It helps in understanding the underlying concepts and reproduces them during the exams to fetch good marks. Lack of it could be disastrous for academic life of an individual.

2) Psychological

a. **Stress Management:** It's the key in the majors like law, administration, business etc. People with good stress management capability are natural leader in the crisis situation where they can easily handle themselves and the other in team. For an individual this is key quality in keeping themselves focused and not losing control and fall into despair. People with good level in this quality are tending to perform well.

b. **Consistency:** A person who is consistent in his efforts is able to perform better all the time. Lacking this quality will result into irregular behavior in performance be it academic or delivering results on time in an organizations. Consistency is the quality

c. **Planner:** This skill helps students to don't get stressed out due to multiple activities. It also helps them in terms of fixing the priorities for the tasks at hand and perform in all of them without compromising in one for the other. This eventually leads in making them learn more aspects of life and helps in broadening the perspective.

d. **Prompt thinking:** This trait is very essential for brain-storming sessions and coming up with new and better ideas. This also helps in negotiations and come up with better solutions through discussions.

3) Cognitive Skills

a. **Information Processing & Decision Making:** Once knowledge is acquired, its processing plays a key role in decision made by different individuals. With the same information two persons will have different decisions for the same hurdle based on their information processing methodology which is very individual in nature for particular person.

b. **Problem Solving:** This quality is innate in human being that's why we have classified it in cognitive skill though it can be improved over time with the right attitude.

c. **Lateral Thinking:** This skill helps in applying concepts learned in one field to different context in another field. This helps in making people come up with extraordinary solutions at times.

d. **Research Ability:** Ability to research helps scholars to take subject matter little further than what is given in text books. This skill is essential for scientists, artists and research scholars. In business also, people with this kind of mind set, can come up with new solutions to the existing problems and meeting the challenges of developing

4) People Skills

a. **Communication:** Needed for expression of ideas and bringing others on the same platform. This is also critical in convincing others.

b. **Managing Human contacts:** Most of the times we need to work in teams either as a player or as a leader. In both of the roles forging good contacts is essential for the betterment of the project be it academic or organizational.

c. **Managing Cultural Diversity:** As world going global, businesses know no boundaries. Follower of apartheid and xenophobia are considered as sick. In the present context one needs to go well with other cultures and traditions and learn to enjoy diversity. This will facilitate leanings from different nationalities and knowing their customs and culture helps in running business there. Thus instilling this skill is very imperative right during the school education.

d. **Leadership:** It has been a long time debate that whether this skill can be learned or people born with this. But is has been consensus that this can be improved over period of time for sure. Academics thus need to inculcate this skill in individuals so the scholars will emerge as leader and can take charge in their respective fields.

We have defined some of the disciplines and their respective skill sets needed for the same. This table can be used to initialize the weights in the neural network so that we can ensure maximum accuracy of neural network.

Subject	Skill Set Needed			
	Attitude	Cognitive	Psychological	People
Law	High	High	High	High
History, Government and Politics	High	High	Low	Low
Writing, Thinking, Argument Building and Public Speaking	High	High	High	High
Basic Sciences	High	High	Low	Low
Physics/ Chemistry/ Biology	High	High	Low	Low
Mathematics/ Computing	High	High	Low	Low
Management	High	High	High	High
Consulting	High	High	High	High
Operations	High	High	Medium	Low
Sales	High	Medium	High	High
Strategy	High	High	Medium	Medium
Engineering	High	High	Medium	Low
Basic Engineering	High	High	Low	Low
Applied Engineering	High	High	Medium	Medium
Administration	High	High	High	High
Arts	Medium	High	Low	Medium
Sociology	Medium	High	High	High
Languages	Medium	High	Low	Low
Commerce	Medium	High	High	Low
Practice	High	High	Medium	Low
Theory (academic)	High	Medium	Low	Low
Medical	High	High	High	Low
Surgery (practice)	High	Medium	High	Medium
Research (academic)	High	High	Medium	Low
Theory (medicine)	High	Low	Medium	High

5. WORKING EXAMPLE OF THE STRATEGY

Let us assume that there are six new entrants to a school and the task ahead of the mentor is to divide them into two study groups. It is intended to divide them into two groups so that diverse skill sets are clubbed optimally to facilitate maximum learning and hence improvement through peer learning.

The students’ hypothetical profiles (indicating marks) are as follows:

STUDENT	COURSE	SUBJECT1 : Marks	SUBJECT2: Marks
STUDENT1	LAW	History, Government and Politics: 80%	Writing, Thinking, Argumentand Public Speaking: 75%
STUDENT2	MANAGEMENT	OPERATIONS: 67%	SALES:90%
STUDENT3	MANAGEMENT	STRATEGY: 78%	SALES:82%
STUDENT4	ARTS	SOCIOLOGY:64%	HINDI:85%
STUDENT5	BASIC SCIENCES	PHYSICS:85%	MATHEMATICS:96%
STUDENT6	MANAGEMENT	STRATEGY: 78%	OPERATIONS:96%

The weight matrix corresponding to the subjects (assuming:obtained by training the neural network over the records of a batch of say 2000 students in the past) are as follows:

Subject/Assigned Weights	Attitudinal	Cognitive	Psychological	People
History, Government and Politics	0.2	0.3	0.25	0.25
Writing, Thinking, Argument and Public Speaking	0.2	0.3	0.25	0.25
Physics/ Chemistry/ Biology	0.2	0.8	0	0
Mathematics/ Computing	0.2	0.8	0	0
Consulting	0.2	0.3	0.25	0.25
Operations	0.2	0.55	0.25	0
Sales	0.2	0.1	0.35	0.35
Strategy	0.4	0.45	0.10	0.05
Basic Engineering	0.4	0.6	0	0
Applied Engineering	0.4	0.6	0	0
Sociology	0.1	0.9	0	0
Languages	0.1	0.9	0	0

Weighted score for the students are as follows:

STUDENT 1	0.31	0.465	0.3875	0.3875
STUDENT 2	0.314	0.4585	0.4825	0.315
STUDENT 3	0.476	0.433	0.365	0.326
STUDENT 4	0.149	1.341	0	0
STUDENT 5	0.362	1.448	0	0
STUDENT 6	0.504	0.879	0.318	0.039

Now if the students are clubbed into two groups with Students 1, 4 and 6 in one group and the rest in the other, the skill-sets are diverse in both the groups and yet optimally distributed in both of them which facilitates the maximum possible amount of peer learning.

6. CONCLUSION

On the basis of the foregoing discussion, a student who goes to any school incorporating this structure for group making should be a gem to any organization. The skills learned by experiential learning are long lasting and represent the whole spectrum of desired qualities required for success in personal and professional life. The schools, by keeping in view the above discussed skills, can make thorough analysis of the new batch of students and existing batch of students before dividing them into study groups or before deciding the sitting arrangement. Thus, this strategy will help any student to imbibe the DNA of successful professional at the helm of any organization to shape its future.

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