

# COGNITIVE DEVELOPMENT BY ZONE OF PROXIMAL DEVELOPMENT (ZPD) GETTIER PROBLEM & CORPUS LINGUISTICS IN EPISTEMOLOGY

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## ABSTRACT

**Aim.** The aim of this research is to promote the use of the three concepts – the Zone of Proximal Development (ZPD), the Gettier Problem, and Corpus Linguistics (Contextual Learning) to increase the academic performance of early undergraduate engineering students.

**Methods.** 30 engineering students completed one untimed Mensa IQ Test of 10 questions and one Simon-Binet IQ Test of 50 random IQ questions with a 12-minute time limit. Before the second Simon-Binet Test, one group, G(a), was given ZPD scaffolding in three major topics – Working Memory, Fluid Reasoning and Spatial Reasoning – as they had incorrectly answered questions based on these concepts in their first Mensa IQ test. The second group, G(b), was not given the ZPD scaffolding. A statistical t-test that was later performed indicated that G(a) outperformed G(b) in the second IQ test.

**Results and conclusion.** The t-test provides evidence that the hypothesis of this research, i.e. that ZPD, Gettier Problem and Corpus Linguistics can enhance the performance of the students in a short time period, is correct. After the first Mensa IQ test, the level of both the groups of engineering students, G(a) and G(b), was almost same, which was indicated by the very similar mean results. However, after supporting G(a) with ZPD in their three problem areas – Working Memory, Fluid Reasoning and Spatial Reasoning – after their first IQ test, the performance of this group improved more in comparison to G(b).

**Research restrictions.** It was not possible to provide all the random questions of the second online test (Simon-Binet) to all 30 students because the total number of questions would be 1500. Further, the third and fourth-year engineering students are not included in this research in inhibition that the effect of the investigated tools would not be clearly visible.

**Cognitive value.** The paper presents empirical research on engineering students, demonstrating the practical utility of ZPD, Gettier Problem and Corpus Linguistics in the process of learning, potentially irrespective of any discipline.

**Key words:** Zone of Proximal Development, Gettier Problem, Corpus Linguistics, interdisciplinary approach, epistemology



## INTRODUCTION

The concept of Justified True Belief (JTB) propounds that whatever belief is justified and found true is knowledge, yet that justification of any truth can be in absence of complete awareness in all respect, or by the rule of disjunction when one fact compels other belief(s) to be a justified truth. If we try to compare any legal judiciary proof with this scope of unjustified knowledge of JTB, then any judiciary verdict will go scot free, but the same open-ended stance of JTB gets converted itself into a vantage point in the field of epistemology for learners. In 1963, Edmund L. Gettier, an American philosopher and Professor Emeritus at the University of Massachusetts Amherst, conceptualised what is now known as the Gettier Problem. Gettier argument is based on the two aforesaid cases (ignorance and disjunction) of JTB and claims that it is difficult to justify any belief as absolute truth. This theory of epistemology is dominant and works as a tool to promote gaining more knowledge rather than relying on any learning concept as a single existing absolute truth. It is an idea that any belief can be justified as truth up to some extent without any guarantee of absolute knowledge (Pardo, 2010).

Another complementary concept to raise the potential level learning of learners irrespective of any field is the Zone of Proximal Development (ZPD) introduced by Lev Semenovich Vygotsky in the late 1920s. ZPD taps the scope for improvement in every learner by identifying weaker spots in an individual or in a group and further turning those weaker spots into stronger spots by providing scaffolding. The term, 'scaffolding' was invented by David Wood, Jerome S. Bruner and Gail Ross in 1976 and it has always been associated with the concept of ZPD (Shvarts & Bakker, 2019, p. 1). This research manuscript aims to prove the utility of ZPD for enhancing learners' ability and performance while familiarising them with the concept of the Gettier Problem. The Gettier Problem encourages students to keep their minds wide awake while learning, considering nothing as absolute truth and simultaneously providing scaffolding – as per ZPD rules – from a better learner in a peer group, a teacher or annotated notes/books. To register the results of applying ZPD, the technique of contextual learning (Corpus Linguistics) was used for areas found difficult by the learners, since ZPD and Corpus Linguistics both focus on socio-contextual learning (Akbar, 2021).

A Gettier Problem shows the potential for false descriptive knowledge obtained in ignorance and resulting from the process of Justified True Belief, which has been discussed in epistemology for more than 50 years since its creation in June 1963. ZPD operates at the point of acquiring knowledge and identifies a learner's weaknesses in order to scaffold those areas. Logically, the use of the Gettier Problem concept is the next phase after ZPD in the epistemology, and coincidentally, they were also proposed in the same chronological order: ZPD in 1920 and Gettier Problem in 1963 (Hazlett, 2015).

In the present research work, the process of acquiring knowledge is viewed at these two levels:

- 1) ZPD – particular difficulty posing areas are identified in the learners through taking a Mensa IQ test and an online Simon-Binet Test, and then retested to prove the utility of ZPD in improving scores;
- 2) Gettier Problem – the acquisition of knowledge by the learners is observed from a wider perspective their gained knowledge justified using the Gettier Problem.

This study also shows that for any type of learning, whether pure logical reasoning (Mensa IQ test) or mixed learning (Simon-Binet Test), ZPD improves the level of the learning, taking the Gettier Problem into consideration. To make knowledge acquisition more practical, application of the concept of Corpus Linguistics is recommended in any field of learning because the perspective of contextual learning is common in ZPD and Corpus Linguistics.

### LITERATURE REVIEW

Awareness about ZPD is found at two different levels, essentialist and involutionalist (Lavin, 2019). The former follows this concept truly and completely, while the latter acknowledges its existence but does not use it for describing the process of development. The terms “zone of actual development (ZAD)” and the “zone of potential development (ZPoD)” (Lavin, 2019, p. 60) are two poles with the distance between them being calculated by the ZPD. Here, the assessment of the potential development is more important than the actual development because these two terms “ZAD” and “ZPoD” have a positive correlation. If one can put effort into the potential development of a learner, then higher actual development can be ascertained. Students require expert assistance to accelerate their learning, whether in the peer learning mode when one student helps others if he/she has such a capability, or under the supervision of higher authority, such as a teacher. ZPD scaffolding has developed over the time with these two modes since “most early mentions of the ZPD and scaffolding in the western world focused on teachers or parents offering guidance to children “but now one can see” a shift in focus towards assistance from peers and an associated focus on reciprocity” (Lavin, 2019, p. 59). In ZPD, there is an external target that a learner is expected to complete, while the process is internally comprised of ZAD and ZPoD. ZPoD controls the ZAD and thus improves the student’s learning level up to the point of achieving the target level of knowledge (Lavin, 2019, p. 60). Ultimately, “[b]y using ZPD we not only know about the maturation process that already completed but also about that processes that are yet to mature and currently are in a state of formation. So what is the zone of Proximal development today will be the actual development tomorrow” (Podolskiy, 2012, p. 2). In the zone of proximal development, emulation or support by an expert helps the learner to overcome peculiar problems which are hindering knowledge acquisition. This type of emulation is only possible once peer learning or expert scaffolding is provided to a learner because s/he grasps the problem structure in peer learning or under the supervision of an expert easily. A learner in such an envi-

ronment is actually imitating in the real sense: "Vygotsky wants to break from a copying view, to give a new meaning to imitation- reflecting a new theoretical position, in which imitation presupposes some understanding of the structural relations in a problem that is being solved" (Aggarwal, 2016, p. 49).

ZPD helps to identify the maturation process in a learner. Thus, it is a process in which "[d]evelopment always begins with what has not yet matured in the child. The potentials for instruction are determined by the zone of proximal development and will be different with two children because the zones of their proximal development are so different" (Aggarwal, 2016, p. 51). Ultimately, "[t]he difference between the child's mental ages, the distinction betwixt the child's actual level of development and the level of performance that he accomplishes in collaboration with the adult, explains the zone of proximal development" (Aggarwal, 2016, p. 52). With scaffolding, the mental age can be advanced by three or even four years. The thought of connecting the cultural settings to the current perspective is reiterated in many research works as it is written that, "Vygotsky's methodology of relating knowledge to its historical and cultural setting, the ZPD needs to be related to one's current perspectives and empirical data" (Breive, 2020, p. 413).

The whole concept of ZPD is explained in a recent research paper in the following manner:

Prior commognitive work has claimed theoretically and demonstrated empirically that productive learning in some situations should rely on imitating the actions of someone more knowledgeable, and that the motivation for these actions is at first social, e.g., seeking the approval of a teacher. This view of learning is consonant with the Vygotskian view of learning as coming to do on one's own what was previously in one's zone of proximal development (ZPD), i.e. could be done only with the guidance of a more knowledgeable expert (typically a teacher), in a process that internalizes activity that is socially accepted as appropriate. (Cooper & Lavie, 2021, p. 1)

This research by Cooper and Lavie in 2021 introduces a new term to the field of peer learning, namely, interdiscursivity, which they define as the blending of discursive elements from different discourses – as a mechanism for designing task situations to support learners in taking their first steps in an emerging discourse.

The same research promotes the view that "[for] the interaction between teacher and learner to be productive, they must achieve inter-subjectivity" (Cooper & Lavie, 2021, p. 2). Helping a student in the required area to fulfil their subjective individual aspects is called a meta-level learning mechanism. In the research of Cooper and Lavie, the term commognition "provides a different (though compatible) perspective on learning. Commognition distinguishes between two kinds of learning, object-level learning and learning at the meta-level" (Cooper & Lavie, 2021, p. 2). Object-level learning is a recognised type of learning but ZPD adds scope for expansion. It also includes new changes around and within us as, "Meta-level learning involves changes in accep-

ted narratives, and even in the rules that govern the discourse, and not just an expansion of endorsed narratives with the help of pre-existing rules" (Cooper & Lavie, 2021, p. 2). ZPD provides "valuable insights into the nature of human development" (Eun, 2017, p. 1). Here, scaffolding is given to a learner with the intention of being internalised, so that after receiving the support a learner can operate with the newly generated, internalised conception. In ZPD, "instruction has to focus on the functions that are ready to develop with the appropriate support from more knowledgeable other. These developing others, in turn, will be internalised and used by the learner independently after the support is withdrawn" (Eun, 2017, p. 3). It is a process where a learner begins with 'interpsychological' and then performs with 'intrapsychological' (Eun, 2017, p. 4).

## POPULATION AND METHOD

The population for this research has been selected among undergraduate engineering students at a reputed college of Rajasthan in the city of Jaipur. Students who were attending online classes were sent a link to Mensa IQ and Simon-Binet tests. Around 120 students from the computer science branch were invited to take the first Mensa IQ test and only 30 students voluntarily responded to it. Upon completion, the first 15 students were given support in the form of an online class during which the questions from the test were addressed, while the other 15 students were directly provided with corrected answers without any support from an expert to improve their weak areas. In the end, both groups were given a Simon-Binet test, with the intention to observe whether the first supported group performs better.

## RELIABILITY AND VALIDITY

The three well-recognised concepts - ZPD, Gettier Problem, and Corpus Linguistics - are utilised in this study for providing an impetus in the learning process of the selected students. These methods are reliable and popular enough to perform any study as it is recommended that, "Educational content depends on verification by leading ideologists who take care to present the 'right' perspective when it comes to the interpretation of facts and events" (Kobylarek, 2019, p.12). To remove the common bias from the collection of data, a large population was sent the initial Mensa IQ test and only the voluntary responses of 30 students were taken into account. Test-retest reliability was maintained by having the students take one more Simon-Binet IQ test. Data was also collected in two groups of students: one was given the ZPD support, while the other was not in order to see the effect of the ZPD mechanism on the performance of the students. Taking Mensa IQ test and later the time-bound online Simon-Binet test of 12 minutes give this research face and content validity as the second 12 minutes' Simon-Binet test is more tough and if one student group out of two groups in the study performs better in it than

the first Mensa IQ test then it shows that one group got benefitted by the scaffolding provided as per ZPD and thus excelled in the second test.

## METHOD

Two tests were taken by 30 early undergraduate students in an engineering college in Rajasthan. The first test was the Mensa Objective IQ Test (MOT), which was posted as an assignment on Google Classroom with a time limit of 4 days. The second was Simon-Binet Test (SBT), which was also posted online, yet with a 12-minute time limit for 50 questions. After the first test (MOT) on Google Classroom, the two groups, G(a) and G(b) with 15 students each, were exposed to a more difficult and timed set of random questions from five categories (SBT). The categories were: fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory. The first test (MOT) was also based on the same categories but it was at the elementary level and self-paced.

After completing the first test, G(a) was given annotations and correct answers to the questions based on their particular problem category and not given any notes for the questions which they answered correctly. G(b) was given annotations and answers for all questions irrespective of their answers, i.e. they were not given specialised scaffolding.

After this, both groups were given the time-bound online SBT IQ test of 50 questions, which randomised questions for all participants. The performance of G(a) was then compared with the performance of G(b). It was expected that G(a) would perform several times better than G(b) as G(a) was given ZPD scaffolding where the guidance was provided for all the questions in all five categories. In the first test, mean results of both the groups were similar, indicating that both the groups had equal calibre but ZPD helped the first group G(a) surpass the second group G(b) in the second test.

In the scaffolding applied to G(a), the concept of the Corpus Linguistics was introduced as ZPD bridges the conceptual gap between the formal problems and real-life problems (socio-contextual learning). Those students who were facing problems in solving a particular question in the first Mensa IQ test were given more common, everyday contextual examples to improve their understanding of the issue. Most often, students faced problems with questions 1, 3, 6, 8 and 9. These questions were from the three areas: Spatial Reasoning, Fluid Reasoning, and Working Memory.

The concept of Corpus Linguistics was applied in these three areas. G(a) students were given access to some useful videos on these concepts, which were contextually appropriate to them as per their demographical and cultural background. They were instructed to watch a required number of videos on these three topics and then take the Simon-Binet test. At the same time, the other group G(b) was not given any such instruction or scaffolding. The names of the students are kept hidden for privacy reasons.

The Gettier's Problem was also introduced to the students to give them an understanding of the fact that there may not be anything that we can call an

absolute truth; we can rather find learning as truth only up to a certain point.

Table 1  
Results of the first MOT IQ test for the student group G(a) (n=15)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
1	1	1	0	1	1	0	1	0	0	0	5
2	1	1	1	1	1	1	1	1	1	1	10
3	0	1	1	1	1	1	1	1	0	1	9
4	1	1	1	1	1	1	1	1	0	1	9
5	1	1	1	1	1	1	1	1	0	1	9
6	0	1	1	0	1	1	1	1	0	1	7
7	1	1	1	1	1	1	1	1	0	1	9
8	1	1	1	1	1	1	1	1	0	1	9
9	0	1	0	1	1	0	1	1	0	1	6
10	0	1	1	1	1	1	1	1	0	1	8
11	0	1	0	1	1	1	1	1	0	1	7
12	1	0	1	1	1	0	0	1	0	1	7
13	0	1	1	1	1	1	1	1	0	1	8
14	0	1	0	1	1	0	1	0	0	1	5
15	1	1	1	0	1	0	1	1	0	1	7

Note: 0 indicates a wrong answer and 1 indicates the right answer.

Source: own research.

Table 2  
Results of the first MOT IQ test for G(b) (N=15)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
1	1	1	0	1	1	1	1	0	0	1	7
2	1	1	1	1	0	1	1	1	0	1	8
3	1	1	0	1	1	1	1	0	0	1	7
4	1	1	0	1	1	1	1	0	0	1	7
5	1	1	0	1	1	1	1	1	1	1	9
6	1	1	0	1	1	1	1	0	0	1	7
7	1	1	1	1	1	0	1	1	0	1	8
8	1	1	0	1	1	1	1	0	0	1	7
9	1	1	0	1	1	1	1	1	1	1	9
10	1	1	0	1	1	1	1	1	1	1	9
11	1	1	1	1	1	1	1	1	1	1	10
12	1	1	0	1	1	1	1	1	1	1	9
13	1	1	0	1	1	0	1	0	1	1	7
14	1	1	0	1	1	0	1	0	1	1	7
15	1	1	0	1	1	1	1	1	0	1	8

Note: 0 indicates a wrong answer and 1 indicates the right answer.

Source: own research.

## HYPOTHESES

We would like to offer two hypotheses for this study:

- H0 = There is no difference in the potential of students after applying the ZPD scaffolding.
- H1 = There is a difference in the potential of students after applying the ZPD scaffolding.

The Gettier Problem is to make a learner consider, after acquiring knowledge, whether the knowledge acquired is secure or whether it needs more justification. This encourages the learner to crosscheck the information to be sure before taking it as absolute knowledge.

## RESULTS

The data used in this research has been collected in one month via Google Classroom from 30 engineering students. They were all first-year students from Bachelor studies in Technology (B.Tech). Two groups (G(a) & G(b)) of 15 students in each were taken into this study. The individual result of the first Mensa IQ test can be found in Tables 1 and 2. These two tables were the main source of information for identifying the questions which were answered incorrectly by individual students and tracing the similar status of other students. Further, the domains of these incorrectly answered questions were identified to prepare and provide the scaffolding.

Here, we have two independent groups of data. The t-Test was performed to investigate the variance between the final score of both groups. It is important to remember that G(a) was given scaffolding before the final time-bound SBT of 50 questions.

The 2<sup>nd</sup> test conducted in the two independent groups G(a) and G(b) shows a significant difference between the groups in the total scores (Table 3: G(a) = 407 and G(b) = 293), with group G(a) performing far better. This fact can be explained by the fact that this group was given guidance on the three factors: Fluid Reasoning, Working Memory and Spatial Reasoning, which both the tests were based on. The composite test scores of individual students for the groups in both tests are displayed in Table 3. To confirm the data reliability and validity, a t-Test was conducted because there was a possibility that the positive effect on the second test appeared owing to the high scores of few students, which would put the hypothesis regarding ZPD in doubt. Only even improvement in all the students in the first group G(a) can prove the effect of ZPD.



Table 3

The result of MOT and SBT tests in both the groups: G(a) (n=15) and G(b) (n=15)

	G(a)			G(b)		
	1 <sup>st</sup> test	2 <sup>nd</sup> test		1 <sup>st</sup> test	2 <sup>nd</sup> test	
	Mensa IQ test results (10 Q.)	Simon-Binet 20-min test results (50 Q.)	Simon Binet test results (average for 10 Q.)	Mensa IQ test results (10 Q.)	Simon-Binet 20-min test results (50 Q.)	Simon Binet test results (average for 10 Q.)
	5	33	7	7	23	5
	10	21	4	8	22	4
	9	34	7	7	15	3
	9	35	7	7	11	2
	9	21	4	9	22	4
	7	31	6	7	18	4
	9	20	4	8	25	5
	9	22	4	7	30	6
	6	31	6	9	22	4
	8	21	4	9	23	5
	7	24	5	10	13	3
	7	32	6	9	23	5
	8	27	5	7	15	3
	5	32	6	7	13	3
	7	21	4	8	18	4
<b>Total</b>	115	407	81	119	293	59

Source: own research.

Table 4

t-Test (unequal variance) for final scores of both the groups G(a) (n=15) and G(b) (n=15) in SBT

	Mean	std. dev.	N
G(a)	5.42	1.12	15
G(b)	3.91	1.07	15
Df	27		
Difference (G(a) - G(b))	1.515		
Standard error of difference	0.399		
Hypothesised difference	0		
T	3.79		
p-value (two-tailed)	.0008		
t-Critical one-tail	1.701130908		

Source: own research.

T-value is greater than the critical value and the p-value is 0.00 at the 95% significance level (see Table 4). Generally, if the t-value is found to be +2 or -2 then it is taken as a significant value. All these facts reject the null hypothesis.

In the first test (MOT), the performance of both the groups was almost equal: the mean scores of the groups were very close—G(a) =115 and G(b) =119—but the final scores from the second SBT show a significant difference.

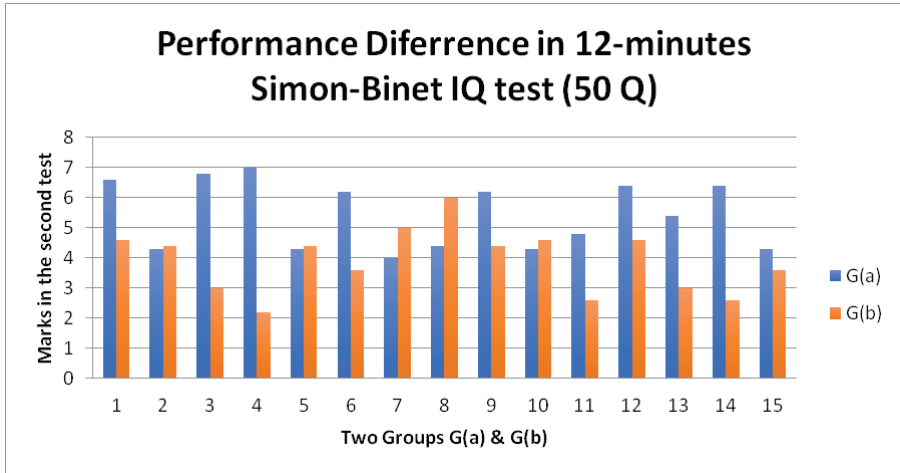


Fig. 1. Comparison of scores in Simon-Binet test of the groups G(a) (n=15) and G(b) (n=15).

Source: own research.

The two groups of 15 students in each, G(a) and G(b), were at a similar level in the first MOT but there was a significant difference in their performance in the second SBT. Telling G(a) before the scaffolding that the test which they have taken was MOT and that the test they will take after the scaffolding session is SBT which will be more difficult as there is a time limit of 12 minutes with 50 questions raises the pressure on the students. At this time, they did not know that there was another group of 15 students in their college who had also gone through the first MOT and that they all performed similarly (Table 3: G(a) = 115 and G(b) = 119).

These two groups were not informed about each other to ensure that there was no collaboration. Both groups were supplied with the correct answers of the first MOT and the only difference was the scaffolding in the first group G(a), while the second group G(b) was immediately requested to take the SBT. Group G(b) was unaware of the major concepts on which these two tests were based, namely: Fluid Reasoning, Working Memory, and Spatial Reasoning. The comparison of the results of the second SBT indicates that G(a) outperformed G(b) by approximately 20% (see Fig. 1). It is thus concluded that students need such assistance as was given in this research in order to help them only in particularly problematic areas on urgent basis, which will save their time and improve their performance by focusing in learning only on their problem area.

## DISCUSSION

ZPD is a tool from the learner-centric teaching approach to be applied in large classes. In populated countries, it is a general scenario that classes are bigger, having numerous students, and it becomes difficult for a teacher to make them learner-centric. Scaffolding is given to weaker students by stronger students who act as teachers in a group (Akbar, 2021). In the present research, the application of this approach is modified as the support of socio-cultural material is used to give scaffolding for the particular questions which the students did not answer correctly. Further, a more stringent online time-bound test was given to students, which was based on the same criteria as both the pre- and post-tests were IQ tests. The results of the present research are more concrete as it was not possible for any student to perform well in the post-test which was comprised of more questions and within a limited time that. Hence, the placebo effect was ineffective as the second test was more challenging and the scores went down. Having used the ZPD scaffolding, the performance of the students increased. The concept of ZPD is generally applied to the children's education, as "Zone of Proximal Development (ZPD) theory explored the perception of pre-service teachers about the application of the ZPD in the classroom" (Ofori-Attah, 2021, p. 139) but the present study has applied it to the graduate level learners, which proves equally effective. ZPD gives language or communication and socio-cultural context a higher importance in the learning process. Sometimes the role of communication in learning is observed by researchers and the results are interpreted with the ZPD concept, which is claimed to be the main motto of Vygotsky for the creation of this concept, i.e. "work that uses the ZPD as a means of interpreting experimental results. What some researchers do not realise is that Vygotsky had some very specific guidelines in mind when he introduced the idea of ZPD" (Hayward, 1995, p. 1). Any method applied to any learning process also helps in interpreting the results of the study and the present research does not stray from it. The result of better performance of the group G(a) is exactly reflecting the improved capacity of this groups in solving the particular types of test questions with the scaffolding. Comparing the result of the present study with other similar studies (e.g. Kusmaryono et al., 2021) gives results of using ZPD not in the concrete form as the validity of employing ZPD is not given clearly. In this study, all processes have taken a measurable form, which is due to the application of the tests such as Mensa IQ or Simon-Binet test. This gives this research advantage over the other ZPD implementation results in any research so far. Many researchers have utilised ZPD in different areas; for instance, Fedde Groot et al. (2019) uses it for regulating the stress levels of medical students. Joost Meijer and Jan J. Elshout (2001) applied it to improve the mathematical skills in students, while James P. Lantolf and Ali Aljaafreh (1995) and Ryan Baker et al. (2020) employed ZPD to investigate the skills of English language and Math. ZPD is taken as moving towards the centre or focusing on the core problem areas to

speed up the learning. It is commonly compared with the theories of Mikhail Bakhtin but the mode of both the theory is completely opposite, "centripetal Vygotskian and centrifugal Bakhtinian" (Cheyne & Tarulli, 1999, p. 5).

In the absence of an expert, for instance a teacher/parent, or expert peer learner, it is recommended to use the books with annotation to offer scaffolding. Thus, carefully designed materials for learning any subject could help students who are distance learning or lacking help from teachers or parents in regular courses.

## LIMITATIONS

The online Simon-Binet test questions were not collected, as the testing program assigned random questions every time it was attempted. Nevertheless, the questions repeated as creating a test with unique questions for all participants would require a set of 1500 questions total.

## CONCLUSIONS

ZPD works at the cognitive level of learners, not for the actual performance of technical skills such as riding a bike, typing on a keyboard, or riding a horse. The use of ZPD is generally not recommended for the adult learning process but in this paper, it is recommended to be used for those who have just entered adulthood. ZPD is generally more suitable for the development process of children but the present study sought to see the impact of this approach on the early undergraduate students in the age group of 18 to 20 years. Thus, it is concluded that three modes of ZPD implementation can be adopted: by peer learning in a group; by the help of a teacher; and by the help of annotations in the study material. The present study focuses more on the socio-contextual learning of the identified problem areas of the learners irrespective of the learning area. It has been debated what kind of materials should be shared with the students so that they could excel in their learning but an approach such as ZPD focuses on the capacity building uses the centripetal approach. This research also gives a new valid mode of testing by taking two tests, with the first test being easier and giving flexibility to the testee and the second test being more challenging and time-bound. Doing this type of pre- and post-testing of the learners' performance, the measurement of the results is conspicuous as the G(b) groups participants cannot perform better in the second Simon-binet test than the first group G(a) without using the proposed tool, e.g. ZPD scaffolding. This research also suggests identifying the domains of particular questions or the topics of any subject, e.g. Working Memory or Fluid Reasoning etc., so that the real problem areas of learners can be identified.

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