

## Combating Learning Loss Through Chess

### What is learning loss?

Covid-19 brought many changes and challenges to society including the impact on education of online-only learning. This impact is especially severe in elementary school grades where students learn some of the key process skills such as reading, writing, and calculation. These skills are prerequisites for most subsequent learning. Research indicates that the highest level of plasticity occurs during the earlier years. Hence **a reduced ability to learn** is especially detrimental during those years. This makes the study of loss of learning an important question.

### What is learning?

Learning can be defined as the assimilation and accommodation of new information with schemas that we have already developed. Assimilation focuses in the taking on of new information, whereas the accommodation is concerned with the integration of new information with prior knowledge. In his stage theory, Piaget explores how the development of thought assists in that process. It is important to note that Piaget's theory is stage theory, not an age theory. Theoretically, a precocious child placed in an optimal learning environment may develop hypothetico-deductive thinking (the highest level of thought in Piaget's model) at a much earlier age than the normal age, provided he or she went through all the stages. Likewise, a child in a poor learning environment, regardless of ability, may never reach the highest stage of thinking. The key to the development of these skills is not a person's ability to think, but rather the interaction of the person's ability to think with the quality of the learning environment.

### The relationship between learning and teaching

Regardless of the developmental differences within and between students, it is the responsibility of the teacher to provide a learning environment where each student can thrive. This is a huge and often daunting task. To the extent that a teacher can accomplish this, learning occurs. Teachers accomplish this task by continually adjusting and re-creating the environment in which learning occurs.

The key to the teacher's ability to do so is a consistent monitoring of students' verbal and non-verbal behavior. In a classroom, a teacher does this nearly unconsciously. Good teachers know when the students are lost and immediately adjust their presentation accordingly. Multiple ways may be used to accomplish this: altering activities, re-explaining the content in a different way, creating special assignments, using group activities in which students can mentor each other to give but a few examples.

In an online environment, this feedback system – essential for the teacher to ascertain the student's need – does not function as well. The nuances in the atmosphere that alerts the teacher that something is not working are not there. The teacher must rely on partial information to decide how to proceed.

Furthermore, the teacher may not be able to switch activities as quickly or efficiently as she could in a classroom. For example, switching suddenly from lecture format to cooperative learning groups may be much more cumbersome. Yet, this is not all that is lost in technology-based environment. A more critical loss may be the bonding between teacher and student and the bonding between students. In short, the supportive, caring climate created by an effective learning community may be missing.

### How does learning occur?

For learning to occur, it takes the collaboration of the student and the teacher. The teacher's role is to create the best possible learning environment. But unless the student is willing to engage with this learning environment, learning does not occur. In an online environment, the feeling of being part of a community is reduced and, in many cases, may be absent. This severely reduces the motivation to engage in the learning task.

The consequences of this loss may be even stronger for ethnic groups which place high value on community. In this case, the effect of online instruction would be more severe. Students in these populations would disengage themselves even faster from the learning task and consequently benefit less from the on-line learning opportunities presented.

All of this does not even consider the potential effect of such distractions as technological difficulties, distraction in the home environment, and other external factors. Hence it is not surprising that a loss of learning. In a pure online environment, the necessary conditions for high-quality learning are only minimally present.

### The problem created by the loss of learning.

Though returning to in-class learning may address some of these issues, one problem remains. What can we do about the lost year? This question is especially pertinent for the earlier grades which focus on essential process skills such as reading, writing and computing; skills which provide the foundation of future learning.

There are no undo buttons in life. We cannot go back and restore the lost year. Trying to accelerate the subsequent year to make up for the lost year does not sound like a promising path. In fact, it may be counterproductive as what was missing in the online environment was not the knowledge to be learned. The curriculum was taught. **Rather what was lost was the development of the necessary tools to integrate new learning with prior knowledge.**

What is curtailed in the online learning environment is the ability of teachers and students to scaffold the learning effort. In a classroom setting, students often provide scaffolding for each other. This may happen in various ways, either by formal means such as group projects where students are required to solve a problem together or in informal conversations when students realize that they have a different answer to the same problem and try to figure out why. In healthy vibrant classrooms, teachers and students build a learning community that provides its members with the right kind of support to assimilate and accommodate the information to be learned.

### What can we do to compensate for the loss of learning?

Although it may be impossible to reverse the loss of learning, we may be able to compensate for it. This can be accomplished by intentionally focusing on maximizing the process of accommodation, with the goal of increasing the amount of assimilated information that is accommodated. This can be achieved by directly **focusing on the development of the thinking skills responsible for the process of accommodation.**

As Piaget pointed out, the thinking processes increase in scope and complexity as we pass through the developmental stages with the final stage being hypothetico-deductive thinking or if-then reasoning. Higher level thinking processes help us make the assimilation – accommodation process more effective.

Although the lost year may have provided a sub-optimal environment to move through Piaget’s stages of development and thereby may have reduced the display of the expected learning skills, it is unlikely that the lost year inhibited the biological factors related to the development.<sup>1</sup> Hence, if we find a way or an environment that maximizes these potentials, we may be able to compensate for the skills lost. A **highly targeted environment**, specifically designed for this purpose, may even increase future learning as even in the best of classroom not all students are able to learn at their optimal rate.

#### What would be the characteristics of such an environment?

The ideal environment for this should have the following characteristics:

- It should have relatively few clear and immutable rules that everyone understands and agrees to.
- It should be a problem-solving environment. Students should be actively engaged in trying to do something or figure something out.
- It should provide students immediately with clear unambiguous feedback if something works or does not work.
- It should encourage the development of rational and logical thinking.
- It should be motivating to all student – both externally motivated students and internally motivated students.
- It should be interactive and communitive. Students and teachers should be able to share and explore new ideas together, especially experimental ideas, to see if something does or does not work.
- It should be complex, comprised of layered levels of knowledge. This will allow for endless exploration and increased understanding, i.e. which allows for enjoying the learning process for itself.
- It should allow students to test abstract ideas in concrete settings and to use concrete experiences to develop abstract thought.

#### Where do we find this kind of learning environment?

**A task analysis of chess indicates that it meets all of the above criteria.** Of these, the presence of a problem-solving environment and the immediate, unambiguous feedback are essential for the development of logical thinking (Pitt (1983), Swanson (1990), Otterbach (2000)). Students love to play. Some play because they love to win. Others play because they are intrigued by the complexity of chess. Regardless of the source of motivation, both types of students are motivated to succeed.

Though many people perceive chess as primarily competitive, it is also very social. Chess players invest considerable time trying to win, only to turn around and discuss the moves, exploring alternatives. The ultimate challenge is not to beat your opponent but to master the game. Chess players can spend hours

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<sup>1</sup> This may not be the case in which Covid-19 created extensive family stress, as stress may inhibit biological factors as well. However, the removal of that stress may foster faster growth. This, however, is a question of further research.

after an interesting game discussing these alternatives, with one player illustrating an idea and the other trying to find a refutation. This is like two philosophers discussing ideas, the difference being that in chess, ideas can be concretely illustrated and unambiguously refuted. These discussions can provide the environment for social bonding between students and between students and teachers.

The cognitive processes used in both cases are the same. Hence, **chess is an alternative path to the core of critical thinking**, namely logic. The essential difference between philosophical argumentation and chess is that chess, like life, accesses both the abstract world of thought and the concrete world of experience. It builds a bridge between these worlds and as such is the ideal medium to teach abstract thought in an engaging manner.

As students develop their thinking abilities through chess, their ability to efficiently select and accurately encode new material will improve. This, in turn, will enable the student to retrieve stored information more effectively. Thus, when presented with new information students will be able to relate new information to prior knowledge, thereby increasing the efficiency of the accommodation process. Consequently, less information will be lost because of mislearning or faulty storage of information. Over time this will result in increased understanding and an improved ability to solve problems, not just in chess but in all domains where critical thinking is demanded. Chess, then, can serve as an engaging platform to compensate for learning loss as well as provide a foundation for future learning.

### Conclusion

The impact on education of online-only learning can be severe in elementary school grades. Learning loss – a reduced ability to learn – can occur due to a variety of challenges in the environment. One way to compensate for learning loss is by directly focusing on the development of the thinking skills responsible for the process of accommodation. A highly targeted environment that encourages problem solving and the development of rational and logical thinking may even increase future learning. Chess and chess-related activities meet the criteria for providing a problem-solving environment that spurs the development of logical thinking and should be considered as part of any strategy to combat learning loss and to increase student success.

### References

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