

## **Quantitative Analysis to Further Validate WC-GCMS, a Computational Metric of Collaboration in Online Textual Discourse**

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### **Abstract**

Online learning has become one of the main ways to receive education nowadays. In order to provide a more efficient and interactive form of online learning it is essential to create a more social learning environment. One of the ways to provide such care is using tactics such as “face-to-face” (F2F) or in-person. When activities used in person are used during online learning, it can help to create a similar feeling one would have in a real classroom. This article explains that Social Coherence (SC) is limited through textual discourse and is not as effective through online learning since there is a barrier through the screen that disables physical touch. Therefore, an equation was modeled to display the levels of social coherence depending on the group size, the level of contribution between each member, and interaction. The Word-Count/Gini-Coefficient Measure of Symmetry (WC-GCMS) is a metric system that helps instantly tell the level of collaboration in online discussions. Social Coherence (SC) also allows us to validate collaboration; however, WC-GCMS is thoughtful of SC making it a powerful metric.

**Key Words:** Social Coherence, Textual Discourse, Collaboration, WC-GCMS

## 1. Introduction

Throughout the ages, social interaction has been ingrained in our nature. Communication, socialization, and physical touch have been vital for our progress and development. Face-to-face (F2F) interaction is not only crucial for productivity and coherence, but it also fosters physical touch, which plays a significant role in enhancing our memory, promoting mental well-being, increasing happiness, and potentially contributing to human longevity. The National Institute of Health explains that nonsensuous touching can cause a variety of benefits for our health. Not only does it release a natural bonding hormone, oxytocin, but also neurological changes affected in the brain when humans touch can increase confidence, decrease anxiety, and enhance our immune system. Physical touch plays a significant factor in coherence because it displays a sense of empathy and deep emotional connections between individuals.

The Word-Count/Gini-Coefficient Measure of Symmetry (WC-GCMS) is a metric system that helps to instantly tell the level of collaboration taking place in online discussion. Social Coherence (SC) also allows us to validate collaboration, however, WC-GCMS is thoughtful of SC making it a powerful metric. This article explains that Social Coherence (SC) is limited through textual discourse and is not as effective through online learning since there is a barrier through the screen that disables physical touch. Therefore, an equation was modeled to display the levels of social coherence depending on the group size, the level of contribution between each member, and interaction. It is easier to assess and regulate coherency with F2F group learners where verbal and visual cues are conveyed. Texting lacks the social coherence levels met in a F2F interaction. As the study shows, social coherence is more prominent when communication is through visual or verbal means. As mentioned in the article, the timing in a text-based and online environment can distort coherency and the contribution sequence.

## 2. Face-to-Face Interaction (F2F)

It is crucial to have an instructor oversee and assist students in order to facilitate effective collaboration among groups. Team projects are typically better organized when conducted face-to-face (F2F) with the guidance of a teacher. On the other hand, with online classes teachers have to rely on breakout rooms in platforms like Zoom to facilitate group discussions. Unfortunately, this approach proved to be less efficient and challenging for student collaboration as it lacks the direct aid of an instructor.

Face-to-face interactions are crucial to social activity and behavior. It helps us understand situations better, digest information more efficiently, and helps us communicate easily. It is understood that it is more common for students to be lost, not comprehend the lesson, & not understand an assignment in online classes. Face-to-face classes provide more motivation to a student and opportunities to act in a more professional setting, developing their own communal skills. Physical interactions allow a teacher to engage with a student and get a better grasp of how their students work and behave.

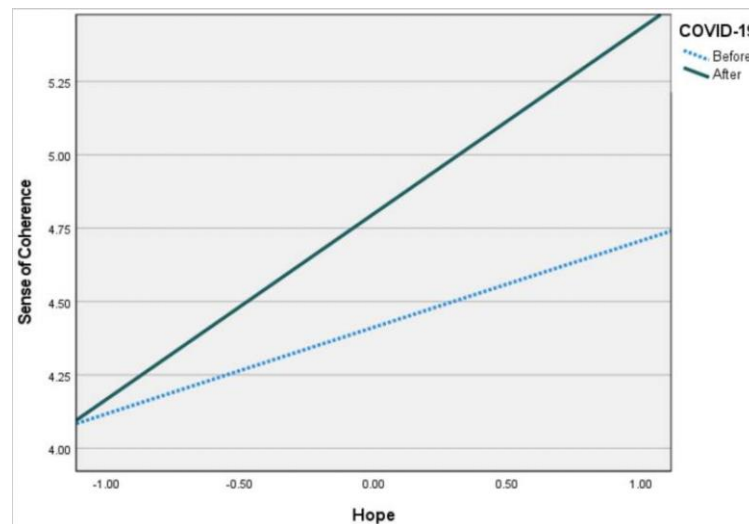


Figure 1

Social Coherence before and after the Covid 19 pandemic

Source: National Health Institute of Science

Reduction of human interaction, however, affects the motivation students have, which can even lead to increased procrastination and lack of care for the class. The lessons should give attention to what students normally enjoy in order for them to keep learning efficiently. In order to make online classes have a similar feel to physical ones, we can incorporate WC-GCMS to increase student interaction. There are other tactics we can use, for example, teachers having one on one meetings with students so they can make sure that although everything is taught online they have a clear understanding of the lesson.

### 3. Enhancing Online Learning Engagement

Maintaining student engagement in virtual classrooms is challenging due to the lack of physical presence and limited social interactions. However, fostering active engagement is crucial for effective online learning. Engaged students participate more, retain information better, and develop a deeper understanding.

Strategies like gamification, interactive quizzes, and virtual simulations can enhance online learning engagement. Gamification uses game elements to make learning interactive and enjoyable. Interactive quizzes provide immediate feedback, while virtual simulations offer hands-on experiences. These approaches have shown positive impacts, such as increased participation, higher completion rates, and improved learning outcomes.

Artificial intelligence (AI) can be used to enhance online learning engagement in a number of ways. AI can personalize the learning experience, provide customized support, gamify the learning experience, and analyze student data. By providing personalized support, gamifying the learning experience, and analyzing student data, AI can help to keep students engaged and motivated, and ultimately improve their learning outcomes.

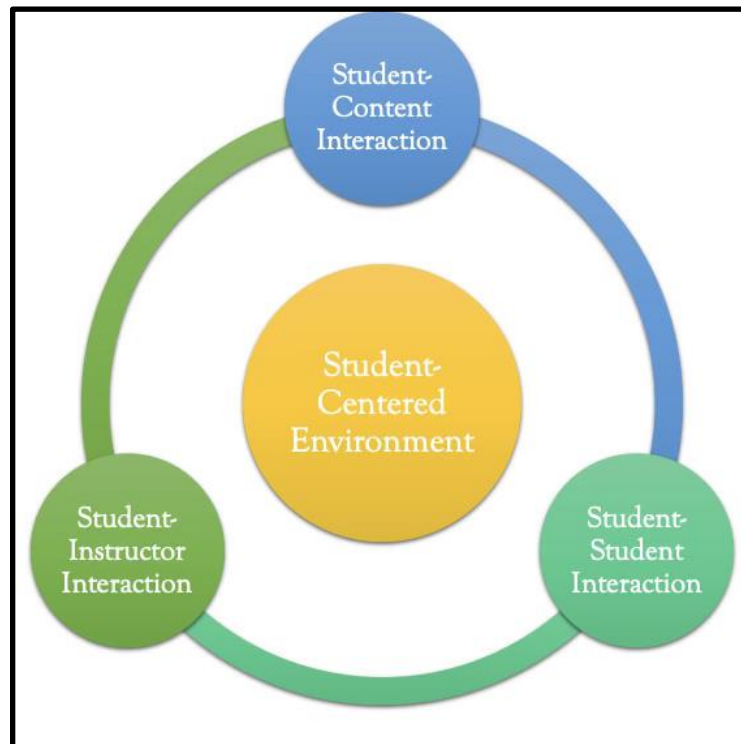


Figure 2

#### 4. Online Community Engagement

Keeping student engagement in virtual classrooms is challenging. AI intelligence can be used to enhance online learning engagement by personalizing the learning experience, providing customized support, gamifying the learning experience, and analyzing student data.

For example, AI can create personalized learning paths for each student, provide real-time feedback, and gamify the learning experience. This would help to keep students engaged and motivated, and ultimately improve their learning outcomes.

Overall, AI intelligence has the potential to revolutionize online learning by making it more personalized, engaging, and effective.

This study aims to bridge the gap between the social awareness experienced by face-to-face and online group learners. Students can enhance their social cognition and collaborative skills by helping teachers envision and create an interactive classroom environment that fosters stronger social connections.

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