

Do collaborative study habits shape personal epistemology?

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We argue in favor of a positive answer to this question, providing evidence from the context of Cuban university students, where study groups form spontaneously at all academic stages. Personal epistemology, measured with a beliefs questionnaire, shows interesting behaviors as function of the group parameters.

In educational environments around the world, the phenomenon of students spontaneously forming groups for a myriad of activities is a common sight. Whether it's for social interaction, project collaboration, or academic study, these self-organized groups often serve as microcosms of teamwork and shared learning. This tendency is especially pronounced in the Cuban educational landscape, where the culture of communal learning is deeply rooted and widely embraced across all levels of academia. In Cuba, the practice of forming study groups is not just a casual or occasional occurrence; it's almost a cultural norm.

Instead of been formally organized or mandated by instructors, Cuban students typically take the initiative to create these groups themselves. They identify peers with whom they share academic goals or subjects of interest and come together to form a cohesive unit. Quite often, these groups are not just temporary alliances formed to tackle a specific assignment or prepare for an upcoming exam, but they remain stable throughout the entire academic year.

The stability of these self-formed study groups offers multiple benefits. It creates a consistent learning environment where students can rely on each other for academic support, exchange ideas, and challenge one another to achieve higher levels of understanding. This long-term stability also allows for the development of strong interpersonal relationships, which further enhances the group's effectiveness as a learning community.

While a substantial amount of research on collaborative learning has been centered around groups that emerge due to specific pedagogical strategies, there exists not much inquiry into study groups that forms autonomously, without any external prompting or intervention from educators. In our research these are termed as spontaneous small groups (SSGs). SSGs are intriguing because they provide a unique window into the world of collaborative learning, purely from the standpoint of the students. While external factors like the academic environment undoubtedly influence the formation of SSGs, the internal factors, specifically students' beliefs about knowledge and the learning process, might play a pivotal role.

On the other hand, the value of cooperative learning and group collaboration, has long been acknowl-

edged for its benefits. It not only fosters socialization but also significantly enhances the learning process. Past research has consistently demonstrated that group discussions often yield better results than traditional lecture-based teaching. Such discussions stimulate critical thinking, facilitate personal and social adjustment, and are instrumental in altering attitudes. Within these group settings, students find it easier to dissect complex ideas, establish connections with previously acquired knowledge, and elevate their individual academic achievements. Recognizing these advantages, contemporary educational curricula are progressively emphasizing the importance of forming such study groups.

It is then only natural to be intrigued about the possible relationship that could exist between the epistemological beliefs held by the students and the specific features of the SSGs they belong to.

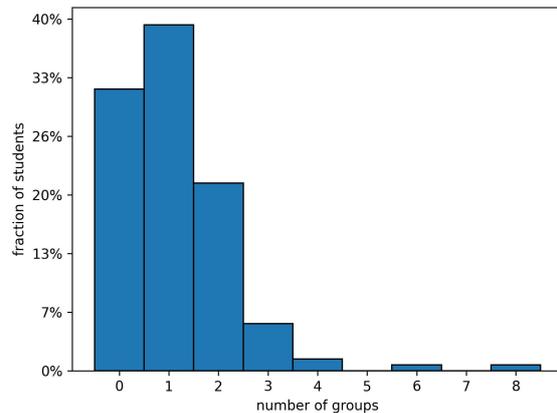


Figure 1: Multi-group preferences for the whole sample. The study found that most students were part of only one SSG. However, the size and number of these groups varied.

The concept of personal epistemology has been a focal point in the domains of cognitive and educational psychology for quite some time. Within the multidimensional paradigm it's posited that individuals cultivate their unique set of beliefs about knowledge and its learning process. These sets of beliefs, referred to as epistemological beliefs (EBs), offer profound insights

into how students perceive learning and knowledge. Over the years, various studies have pinpointed core beliefs within this framework. Some of these include beliefs about the structure of knowledge, its source, its certainty, as well as beliefs about the speed at which one can learn and the inherent ability to do so.

In 2021 we published a report [1] where a sample of 151 bio-medical engineering students was interviewed about study habits and EBs. Our study encompassed three distinct academic years, namely junior, intermediate, and senior. The students were surveyed to identify the SSGs and their EBs. The process of identifying spontaneous study groups was facilitated through a comprehensive survey, administered to all participants, in which they were asked to simply list their study mates. Following a cluster analysis, the groups were found and characterized, in particular regarding its size and distribution along the sample (see Fig. 1).

The epistemological beliefs were measured using a 34-item EBS questionnaire consisting of 34 statements. Students were asked to rate these statements on a 5 point Likert scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5). The survey aims to assess various dimensions of students' beliefs about knowledge and learning. The answers were grouped into 10 subscales, which include beliefs like *Success is unrelated to hard work*, *Avoid integration*, *Do not criticize*, *Avoid ambiguity*, *Learning is quick*, *Knowledge is certain*, *Depend on authority*, *Seek single answers*, *Ability to learn is innate*, and *Learn the first time*.

These subscales were then analyzed to derive factors that represent the underlying epistemological beliefs of the students (see Table 1). A factor analysis was applied, leading to the identification of a four-factor structure for the epistemological beliefs. The four factors of EBs were named as: *Passive Learning*, *Certain Knowledge*, *Knowledge Handed down by Authority*, and *Quick Learning*. These factors accounted for 56.7% of the variance. The structure was subsequently validated using confirmatory factor analysis and the factors used to correlate with SSG variables.

Finally, the study found interesting relationships between EBs and SSGs. For students who studied alone (i.e., not part of any SSG), there was a tendency to have naive beliefs about Quick Learning. This suggests that the absence of group interaction may limit exposure to diverse viewpoints, thus affecting beliefs about the speed and nature of learning.

Correlations between EBs and SSGs were also found to differ depending on the academic year. For junior (second-year) students, a significant correlation was observed between the size of the study group and the belief that knowledge is handed down by authority. Specifically, the larger the group size, the more likely junior students were to hold this naive belief. This suggests that younger students in larger groups may be more susceptible to accepting information without critical evaluation. For senior (fourth-year) students, it

was found that both the size and the number of SSGs were negatively correlated with the belief in Passive Learning. In other words, senior students who were part of larger and multiple study groups were more likely to have sophisticated beliefs about learning being an active process. This could indicate that as students gain academic experience, group study may play a role in fostering more complex and nuanced beliefs about learning and knowledge.

Subscale	Fac. I	Fac. II	Fac. III	Fac. IV
<i>Success is unrelated to hard work</i>	.708			
<i>Avoid integration</i>	.703			
<i>Do not criticize</i>	.612			
<i>Avoid ambiguity</i>		.671		
<i>Learning is quick</i>		.589		
<i>Knowledge is certain</i>		.568		
<i>Depend on authority</i>			.825	
<i>Seek single answers</i>			.504	
<i>Ability to learn is innate</i>				
<i>Learn the first time</i>				.879

Table 1: Higher loads for factors with eigenvalues greater than 1, subscales are built from the 34 items of the EBS. Factor I: Passive Learning; Factor II: Certain Knowledge; Factor III: Knowledge Handed down by Authority; Factor IV: Quick Learning

These findings reveal unexpected information about how beliefs and group dynamics are linked across different academic levels. For younger students, larger study groups were associated with less sophisticated views, specifically the belief that knowledge is simply passed down by authority figures. In contrast, older students in larger and multiple study groups exhibited more complex beliefs, particularly regarding learning as an active process. This surprising trend among younger students is examined through a sociological lens, hinting at the evolving nature of group interactions. As far as we're aware, this is a primary evidence to demonstrate that the size of study groups can either enhance or diminish the complexity of students' beliefs, depending on their academic stage.

Future research should delve deeper into the internal makeup of these groups to fully understand these outcomes. By gaining a solid understanding of these dynamics, educators are better positioned to devise pedagogical strategies that are more aligned with the students' individual and collective learning perspectives. Such alignment can potentially optimize the learning process, ensuring that students not only acquire knowledge but also develop greater understanding and appreciation of the learning journey.

Notes

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References

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