

Effectiveness of a "semi-flipped" class in the teaching of pharmacology and its prerequisites

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Introduction

Pharmacology is one of the biomedical sciences covered in Medical School whose learning generates more difficulties for students.

Difficulties are explained by the high number of drugs to be reviewed, the complexity of the mechanisms of action and the prerequisites (i.e. anatomy, physiology, biochemistry) that must be mastered by students.

It is common that during class sessions students refer not knowing, or remembering some concepts - essential prerequisites.

Our innovation proposed to clarify the prerequisites and articulate them with objectives of the course. We also created a space, inside the learning management system (LMS) (Blackboard) to allow self-evaluation for students and provide access to resources that students could use to review prerequisites and study before the learning sessions.

Results

Learning Environment		Categories/Subcategories		%	
Pedagogical model	Adaptive learning			79%	54%
		Functionality and usability		89%	94%
Technology tools	IT support to the learning process	Content provision		89%	89%
				94%	89%
		Knowledge construction		83%	60%
Innovation objective	Methodological objectives	Self regulation		67%	78%
				60%	44%
		Flexibility		85%	90%
				70%	92%
Active learning	Individual		87%	80%	
			75%	49%	
			70%	75%	
			72%	62%	
Disciplinary content			69%	82%	
Assessment			16%	79%	
Instructions and Guidelines			97%	39%	
Articulation of the course elements			43%	52%	
Interactivity			82%	44%	
Academic load			34%		
Motivation			79%	72%	
Satisfaction			79%	80%	
			79%	72%	
			77%	77%	
			85%	80%	
			54%	59%	
			94%	57%	
			79%	74%	
			75%	65%	
			71%	65%	
			76%	68%	
			78%	79%	
			92%	77%	
			66%	62%	
			72%	57%	
			72%	69%	
			97%	97%	
			95%	95%	
			79%	90%	
			67%		
			52%	67%	
			56%		
			92%		
			83%	33%	
			24%	68%	
			68%	73%	
			79%	79%	
			25%	22%	
			60%	73%	
			89%	90%	
			70%		
			69%	92%	
			93%	79%	

Figure 1. Overall experience. Different elements of the innovation were evaluated and are shown in the left columns. In summary, students appear to enjoy the innovation. Green results show items that students rated favorably. Red items show elements that could be improved

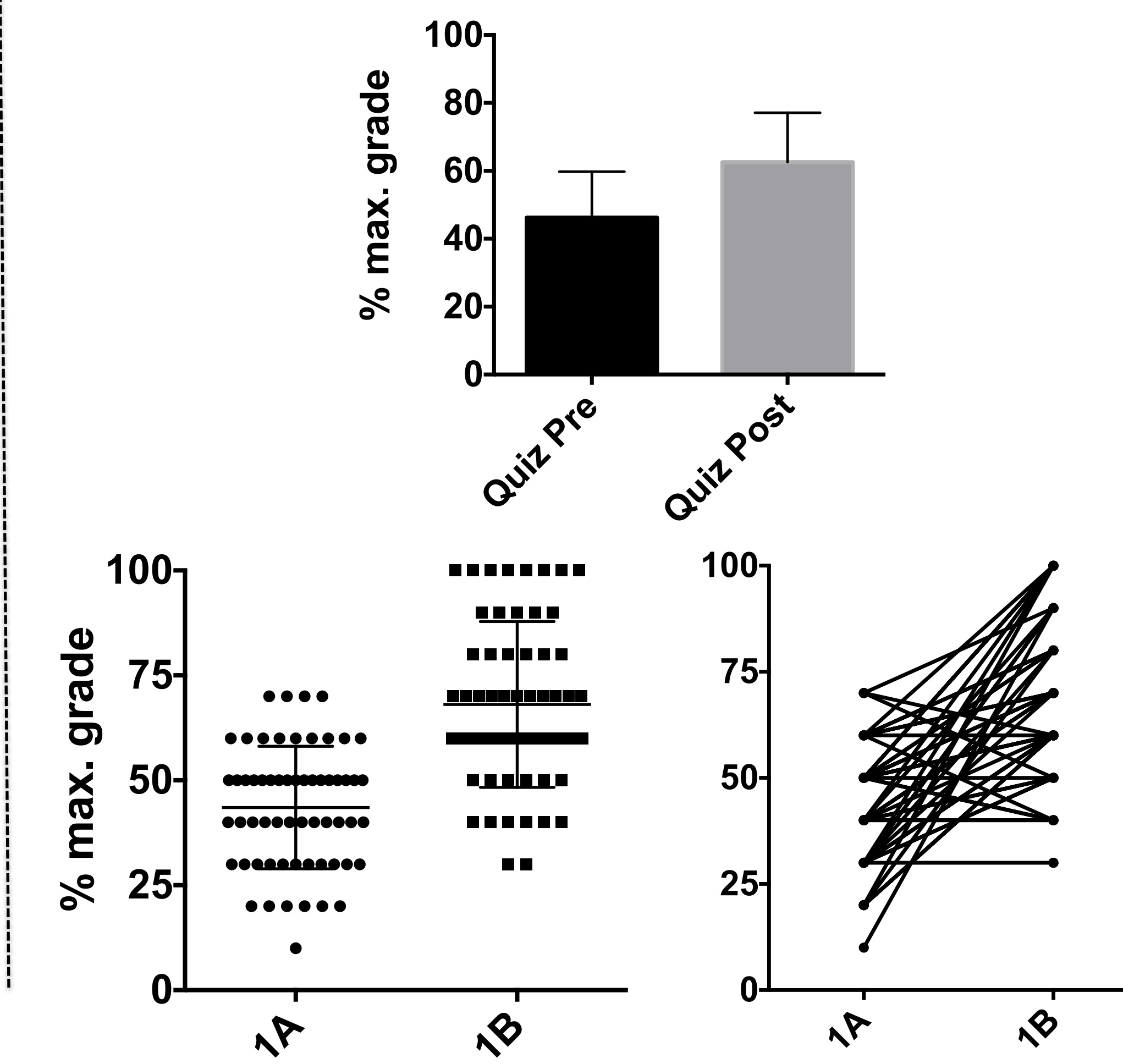


Figure 2. Improvement in quiz scores (Quiz #1 neuropharmacology) Knowledge about prerequisites was evaluated before each session. Student knowledge increases after the study of the suggested materials (Top panel.). Most students benefit of the innovation (Bottom panels).

Figure 3. Perceptions of students about the innovation. Students rated favorably the sequence of activities (left). Students consider that individual work and lectures were more useful in their learning process (middle). Student have problems with their time management (right)

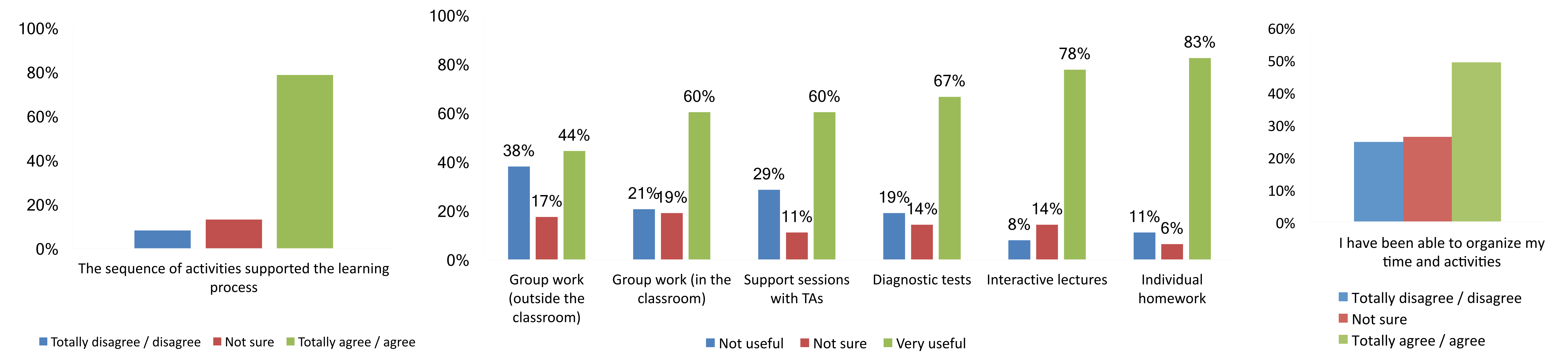
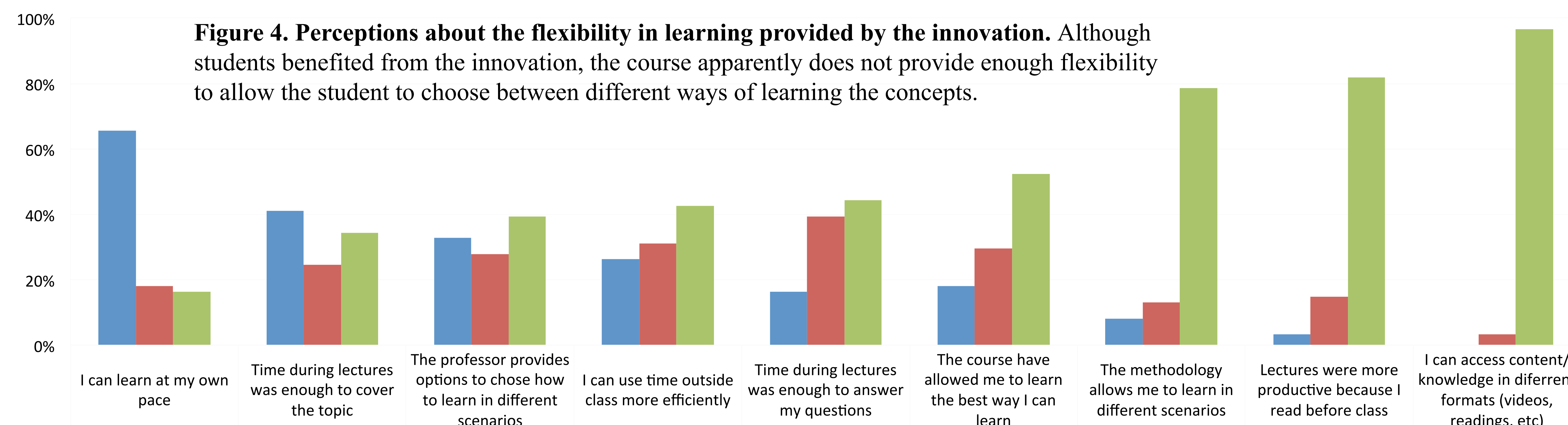


Figure 4. Perceptions about the flexibility in learning provided by the innovation. Although students benefited from the innovation, the course apparently does not provide enough flexibility to allow the student to choose between different ways of learning the concepts.



Conclusions

Conceptual prerequisites should be evident in a biomedical sciences courses and resources to master these concepts are valuable study aids for learners.

Strategies that promote better time management and work organization skills could be a valuable additions to educational innovation that seek self regulated learning.

Flexibility in allocation of resources, scenarios and time for activities could enhance even further the engagement of students in flipped classrooms and courses that are based in active learning.