Online Student Team Learning

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Abstract—Collaboration among students working in groups to master new material has been defined as Student Team Learning. While past research has focused on groups of students working in the classroom, this study presents evidence of Student Team Learning by students working in groups online. A group activity conducted during a classroom offering of an upper-level university course in the fall of 2019 is compared with the same group activity conducted during an asynchronous offering of the same course in the spring of 2021. On both occasions, groups used Google Docs to work online, and Google Docs screenshots reveal that Student Team Learning occurred in groups working online whether or not the students in those groups interacted in the classroom. The evidence provided is particularly relevant in the wake of the Coronavirus pandemic, which has accelerated the migration at universities worldwide toward hybrid and asynchronous courses that incorporate online group work.

Keywords— asynchronous course, online group work, online pedagogy, Student Team Learning.

I. INTRODUCTION

Placing students into groups can magnify the effectiveness by which new material is presented. The process by which this occurs in a foreign language course such as the one discussed in the present study is described by Long and Porter, who assert that group work promotes language practice through opportunities for students to participate in the foreign language [1]. Opportunities for practice are increased by enlisting interaction within groups of students, rather than interaction between one student and the instructor, as the means for assimilating new material. In the years after Long and Porter's study, Student Team Learning was established as a metric for determining whether students were benefiting from working in groups. Student Team Learning occurs, as Szostek explains, when "[n]ew material is presented by the teacher and then the students work within their groups to master the lesson. Teammates must assist one another in learning because the success of the group depends on the mastery of the lesson by each member" [2]. While research has been done on Student Team Learning within groups that interact in the classroom, the present study describes a method for assessing the extent to which Student Team Learning occurs among students working in groups that interact online. Screenshots presented to document the success of this method were collected from classroom (fall 2019) and asynchronous (spring 2021) offerings of Spanish 331 (Introduction to Hispanic Culture), an upper-level university course taught completely in Spanish that centers on key cultural moments in Spain from prehistoric to modern times.

II. METHODOLOGY

The primary indication of successful Student Team Learning is collaboration during group work. Research has consistently shown that students placed in groups in the classroom "demonstrate higher performance, better attitudes, and more interactive group behaviors" [3]. In addition, collaboration among students contributes to "enhanced student knowledge, team communication, leadership, [and] problem solving abilities" [4]. It is through collaboration, as Johnson, Johnson, and Smith explain, that "individuals seek outcomes that are beneficial to themselves and beneficial to all other group members" [5]. In fact, research on Second Language Acquisition demonstrates that "compared with a teacher-fronted activity, group work provides students with many more opportunities to practice using the target language and to engage in direct interaction" [6]. In a course taught in a foreign language like 331, students will be motivated to collaborate within a group when they consider themselves to be individual benefactors of achieving grammatical accuracy in a target language. Students often work in groups of five or six when 331 is taught in its classroom format (three fifty-minute MWF classes), when collaboration can be personally observed by the instructor. However, when more than three or four groups are involved, assessment of collaboration can be difficult to gauge through classroom observation alone.

Google Docs provides instructors with the means for assessing whether collaboration occurs among students working in groups. Google Docs offers students a free word processing program that contains the full range of editorial tools. Individual students can make entries into a Google Doc viewed by other students on their computer screens, which allows anything entered to be seen by all members of a group. The instructor is the "owner" of a group's Google Doc, and as such has the option of being notified by email in real time when entries to the Google Doc are made.

In addition, Google Docs works seamlessly with Canvas, the course shell used at many institutions of higher education in the United States to house content for classroom and online courses. By using "Colaboraciones" (Collaborations) on Canvas, which appears in the list on the left in in Fig. 1, an instructor can connect students working together to a group Google Doc.

Fig. 1. Spanish 331 Group Google Docs links on Canvas in the spring of 2021.

Instructors and students connected to the same Google Doc can access that document by clicking on a highlighted link (for example, "Grupo 4 Google Docs primavera 2021" in Fig. 1), which leads directly to a screen containing word processing tools and the document into which entries are made. This screen is shared by the members of the group and the instructor, as shown in Fig. 2.
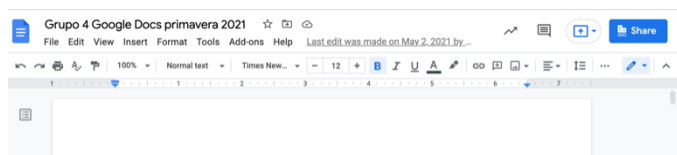
Fig. 2 Group ("Grupo") 4 Google Doc, spring 2021.

It is instructive to point out that a group Google Doc can also be accessed by clicking on Google Drive , which appears in the list on the left in Fig. 1 (below "Colaboraciones"). Google Drive, which functions better on some devices when using Canvas, takes students to their individual Google Docs accounts, where they will see their group Google Doc and any other Google Doc documents that they personally keep on file.

Assignments on Google Docs are completed after one of the members of a group submits the link to the document. Instructors can incorporate the process of submitting a Google Docs link into an assignment housed on Canvas, as in the cases of the Google Docs group essays discussed in the present study. By using this method, instructors automatically insert grades for assignments into the Canvas gradebook, which eliminates the need to utilize paper and provides students with a record of their progress and up-to-date calculations of their overall course grades.

For instructors, the version history of a Google Docs document provides a record of all entries made by students and the times entries were made. This feature of Google Docs is accessible to the instructor by clicking on the "Open version history" button, as illustrated in Fig. 3.
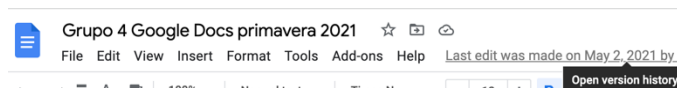
Fig. 3. Accessing a version history on Google Docs.

Google Docs version histories can be particularly useful in determining if work within a group is being distributed equally among group members.

For example, as illustrated in Fig. 4 and Fig. 5, different

colored highlighted text corresponds to entries made by students working on the Google Doc. When only one member of a group is working on a Google Doc, as in Fig. 4, the highlighted text corresponds to a single dot on the right that is followed by the name of the student and the time the highlighted text was typed.
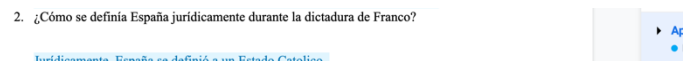
Fig. 4. Entry made to a Google Doc by an individual student.

When two or more students are working on a Google Doc simultaneously, each student's contribution is evident in the different colored text, as in Fig. 5.
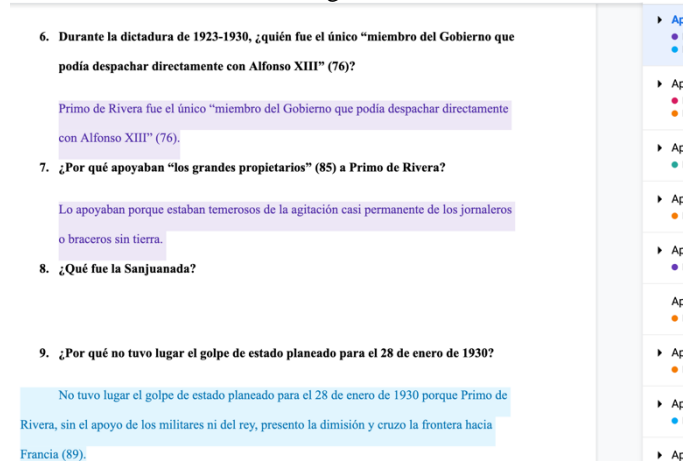
Fig. 5. Entries made to a Google Doc by students working on the document simultaneously.

Fig. 5 documents the collaboration that is essential for the completion of a typical group assignment in 331, which requires sentence- or paragraph-long answers written in Spanish. The moments at which answers to questions six, seven, and nine were entered are captured in Fig. 5. The students who entered the answers to questions six, seven, and nine had the opportunity to see and correct answers entered previously by other students in the group to questions one through five. As they work in groups, each student thus participates in the evolution of all the discourse that ultimately constitutes the assignment submitted. Phrases, sentences and paragraphs entered by students are examined by multiple sets of eyes and are refined on conceptual and grammatical levels.

The effectiveness of Google Docs as a tool for assessing Student Team Learning is evident in version histories from Google Docs activities during the fall 2019 offering of 331, which enrolled 25 students who worked in groups of the same five students throughout the sixteen-week semester. One activity, the Google Docs group essay, was conducted over the course of three classes. On the first day, each student reacted individually to images viewed in the classroom by electronically submitting Word documents to the instructor that contained three twenty to thirty-word sentences in Spanish. In these three sentences, students were required to identify "diferencias y similitudes entre la arquitectura romana de Tarragona y la arquitectura islámica de Medina Azahara" (differences and similarities between the Roman architecture of

Tarragona and the Islamic architecture of Medina Azahara). It is instructive to underscore that, prior to composing their sentences, the students had been introduced in a previous class to characteristics of peninsular Roman and Islamic architecture.

Prior to day two, each student received electronically their corrected and graded sentences (the grade depended on content and grammatical accuracy) before meeting in groups during class. In the group meetings, the students discussed topics contained in their sentences. Although they had been informed that the essay would be based on these topics, they did not yet know the precise wording of the question they would be required to answer. On day three, the essay topic was revealed at the beginning of class: "¿Cuáles son algunas diferencias y similitudes entre la arquitectura romana de Tarragona y la arquitectura islámica de Medina Azahara? ¿Qué dicen esas diferencias y similitudes sobre las dos culturas?" (What are some differences and similarities between the Roman architecture of Tarragona and the Islamic architecture of Medina Azahara? What do these differences and similarities say about the two cultures?). Groups had fifty minutes to compose essays of 325-350 words on Google Docs and submit a link to the Doc to the instructor to indicate completion.

The same Google Docs group essay was repeated during the subsequent offering of 331, in the spring of 2021, when the course was redesigned and offered in an asynchronous format in the wake of the Coronavirus pandemic. Asynchronous 331 enrolled 22 students, who worked in groups of the same five or six students throughout the sixteen-week semester. Groups were required to submit two to three assignments per week via Google Docs, including the Google Docs essay, which took place over a one-week period as during the fall of 2019.

In the spring of 2021, prior to the Google Docs essay students viewed images of Tarragona and Medina Azahara online and then submitted their three sentences individually. After students received their corrected and graded sentences, groups were instructed to meet on a virtual platform (such as Zoom), at times arranged by the students, to discuss the topics contained in their sentences. On the day of the essay, the instructor revealed the essay question to the groups at a time that had been agreed upon at the beginning of the semester so as to ensure the availability of all students. The groups then had fifty minutes to complete the essay (325-350 words) and submit the Google Doc link.

The fact that the Google Docs essay was conducted over the same time frame and involved the same content in both classroom and asynchronous 331, unlike other group assignments whose virtual version was modified from the classroom one, invited comparison of Google Docs version histories from 2019 and 2021. It is instructive to underscore that the only difference was that groups in asynchronous 331 never interacted among themselves or with the instructor in the classroom. The results in the case of asynchronous 331 thus reflect Student Team Learning in a completely online environment.

III. Metric for Measuring Student Team Learning

In the spirit of what Szostek describes as "mastery of the lesson," the metric used for comparing Google Docs version histories from 2019 and 2021 was mastery of grammatical

concordance in Spanish, which constituted fifty percent of the final grade on the essay in classroom and asynchronous 331.
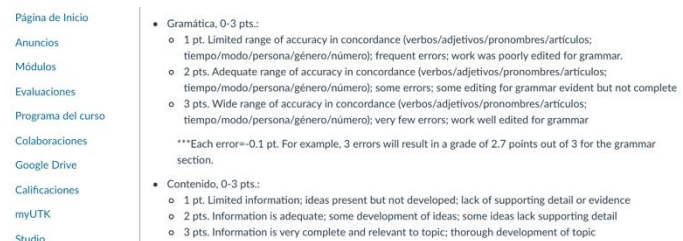

Fig. 6. Components of final grade for the Google Docs group essay.

As explained in Fig. 6, the final grade for the Google Docs group essay was based on a total of six points: three points could be earned for content that responded in a completely relevant manner to the essay topic, and three points could be earned for a high level of accuracy in grammatical concordance. Unlike the three points for content, which are awarded somewhat subjectively, grammatical concordance, the metric used to assess Student Team Learning, was entirely objective. Each grammatical mistake involving concordance (including verbal mood, person, and tense and gender, number, and person of adjectives, pronouns, and articles) would reduce the final grade by 0.1 points. For example, if a group made seven such errors (resulting in a loss of 0.7 out of three points), the highest final grade on the essay it could achieve would be 88% (5.3 points out of 6), even if it earned all three points for content.

IV. Results

Screenshots from fall 2019 Google Docs group essay version histories provide evidence of collaboration among students who achieve mastery of a lesson, which indicates Student Team Learning. Each screenshot records a moment in the composition of the essay. The different colored dots on the right of the screenshots represent students working simultaneously, and the corresponding different colored text reveals their entries during the time they collaborated. Text not highlighted by a color in the screenshots was already present in the Google Doc at the moment the two students began to collaborate. In some screenshots, therefore, two students are working together on text entered by another member of the same group prior to the time the collaboration begins. The modifications that reflect a mastery of grammatical concordance by the two individuals working in tandem in the screenshots directly contributed to the success of the group insofar as all group members received the same final grade for the essay.

Fig. 7. Fall 2019 collaboration on correction of errors.

Fig. 7 portrays the intervention of a student (green), who deleted text entered by another student (orange) ("Parece que la arquitectura islámica de Medina Azahara" [It seems that the Islamic architecture of Medina Azahara]). The latter student (orange) then provided the correct plural endings to previously entered text by adding -eron ("fueron") and -s ("talladas"). The result is a coherent phrase that is also grammatically concordant

("Un aspecto único de la arquitectura islámica de Medina Azahara es que parece que las construcciones fueron talladas en la tierra" [A unique aspect of the Islamic architecture of Medina Azahara is that it seems as if the buildings were cut into the land]).
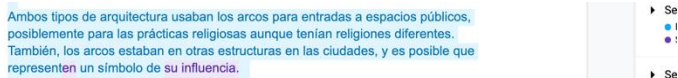

Fig. 8. Fall 2019 collaboration on correction of errors.

Fig. 8 documents collaboration between two students in the completion of a paragraph. One student (purple) not only concludes the paragraph with a phrase ("su influencia" [its influence]) that provides closure to an idea ("es posible que" [it is possible that]) introduced by the other student (blue), but the first student (purple) also adds the present subjunctive ending -en ("representen" [represent]) to establish concordance and complete the expression of the idea ("…es posible que representen un símbolo de su influencia" [it is possible that they represent a symbol of its influence]). The result, once again, is a coherent phrase that is grammatically concordant. In both Fig. 7 and Fig. 8, the corrections made indicate a mastery of grammar skills and the collaboration of students to ensure the success of the group.

Similar indications of Student Team Learning are evident in screenshots of Google Docs version histories from the spring of 2021. As in the cases of versions histories from the fall of 2019 (Fig. 7 and Fig. 8), Fig. 9 and Fig. 10 document instances of collaboration during the composition of group essays.
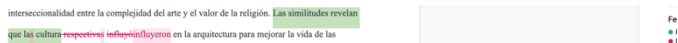
Fig. 9. Spring 2021 collaboration on correction of errors.

In Fig. 9, each of the two students collaborating makes a correction to text entered earlier. One student (green) adds a phrase ("Las similitudes revelan que la cultura" [The similarities reveal that the culture]), which the other student (pink) modifies by adding the plural marker -s ("las culturas" [the cultures]) and inserting the correct verbal form ("influyeron" [they influenced]). The resulting phrase achieves grammatical concordance ("Las similitudes revelan que la culturas influyeron" [The similarities reveal that the cultures influenced]).

Fig. 10. Spring 2021 collaboration on correction of errors.

In Fig. 10, two students again make corrections to text entered earlier while working together. One student (green) adds a phrase ("Estas características" [These characteristics]) that expands on the conclusion of the previous sentence ("tienen muchos detalles y belleza" [they have many details and a lot of beauty]). The second student (blue) adds the correct third person plural marker -n ("reflejan" [they reflect]). The result is a coherent and grammatically concordant transition between sentences ("tienen muchos detalles y belleza. Estas características reflejan que" [they have many details and a lot of beauty. These characteristics reflect that]).

It merits pointing out that other concordance errors in Fig. 10

were corrected before the final version of the group essay was submitted ("la gente" [the people] was changed to "los residentes" [the residents], and "estaba" [it was] was changed to "estaban" [they were]). As in the Google Docs version histories from the fall of 2019, the version histories from the spring of 2021 reveal that students within groups collaborated for the benefit of their groups.

The parallel that may be drawn between the levels of Student team Learning is clearly documented in Fig. 11 and Fig. 12, which are final Google Docs version histories collected, respectively, from group essays conducted during the fall of 2019 and the spring of 2021.
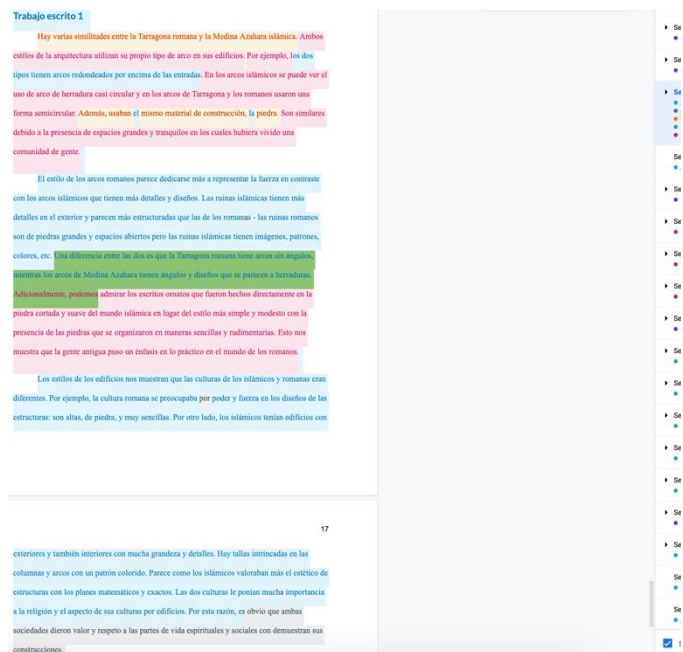

Fig. 11. Fall 2019 Google Docs group essay final version history.
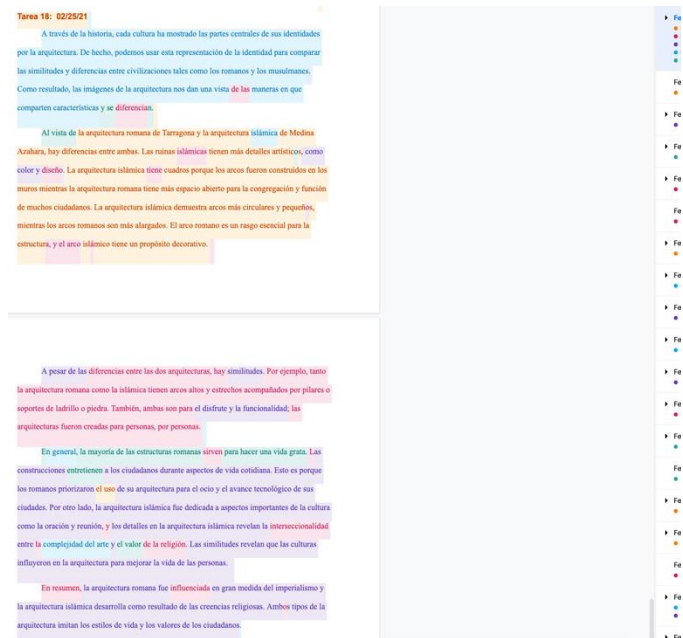

Fig. 12. Spring 2021 Google Docs group essay final version history.

Fig. 11 and Fig. 12 both demonstrate that all five members of

the groups involved worked simultaneously on the final version of their group essays. The group of five colored dots on the top right that is highlighted in blue in each Fig. represents contributions made during approximately the final thirty minutes of the composition of each essay, which is the time between the completion of five-person collaboration and the time of the previously recorded entries by individual students indicated in Fig. 11 and Fig. 12, respectively, by green and orange dots.

The simultaneous collaborations among five students recorded in Fig. 11 and Fig. 12 exemplify the process by which Student Team Learning encourages "individuals [to] seek outcomes that are beneficial to themselves and beneficial to all other group members." In this context, it is instructive to underscore that the different colored text in Fig. 11 and Fig. 12 contains text that had been entered previously by individual students (represented by the un-highlighted single dots on the right of each Fig. beneath the highlighted groups of five dots), and in one case in Fig. 11 by a group of two students (green and purple dots in the bottom right of the Fig.). In other words, after making individual contributions to the essay during the first twenty minutes (which may have included text from the three-sentence individual assignment), Fig. 10 and Fig. 11 confirm that, during the remaining thirty minutes, all students in each group collaborated on the final version of the essay.

V. CONCLUSIONS

The Google Docs version histories from group essays completed during the fall of 2019 and the spring of 2021 demonstrate that Student Team Learning can take place online whether or not students in a group interact in the classroom. Both essays in 331 were written five weeks after the respective semesters had begun, which gave in person and online groups the same amount of time to develop the coherence necessary for collaboration. At the same time, the absence of interaction with an instructor by students in asynchronous 331 confirms that such coherence can develop organically, which is perhaps the most significant finding in the present study.

In other words, during the five weeks prior to the composition of the Google Docs group essay, groups in the fall of 2019 developed the collaborative skills that drive Student Team Learning as they worked in the classroom to assimilate new material immediately after it had been presented to them by the instructor. This simultaneous proximity to new material by all members of a group was not a feature of asynchronous 331. During the five weeks prior to the composition of the Google Docs group essay in the spring of 2021, new material was presented online without the intervention of the instructor, and the time between which students received new material and collaborated on Google Docs to complete assignments depended on the members of the group. In this context, the documented times that entries were made in the spring of 2021 to group Google Docs, which served as the platform by which all assignments were submitted in asynchronous 331, confirmed an additional benefit of online group work, which is particularly relevant in the wake of the Coronavirus pandemic: groups can be given sufficient time in advance to submit assignments so as to allow group members to collaborate when their schedules permit, including during the evening or on the

weekend.

Aside from semester-long online (rather than classroom) interaction among students working in groups, the major difference between classroom 331 and asynchronous 331 is, therefore, the lack of interaction between the instructor and the students. Students can arrange Zoom meetings with the instructor, but they must learn to work in groups on their own without the encouragement of the instructor, which is often necessary in the classroom to inspire collaboration among students. In order to complete assignments in an equitable manner, groups working together asynchronously must ensure without the intervention of an instructor that all students in the group receive and assimilate new material. This feature of asynchronous learning undoubtedly contributes online, as in the classroom, to "more interactive group behaviors" and greater "leadership" and "problem solving abilities" that scholars have observed among students working in groups.
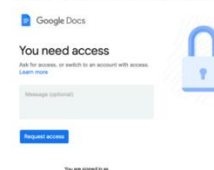
Shifting the responsibility for organizing group work to students is accomplished in asynchronous 331 by explicit instructions, which are available on the Canvas course home page, as shown in Fig. 13.

Fig. 13. Instructions for group work in asynchronous 331.

In asynchronous 331, students must rely on the instructions in Fig. 13 to initiate online communication with other group members and to collaborate on the completion of assignments. The importance of collaboration is underscored in these instructions: "Cooperation to reach consensus as to which answers constitute the group answers, and to prepare for and complete the composition of the two essays, will be crucial and

the responsibility of each group member." Since students in asynchronous 331 never interact with an instructor in the classroom, the onus of collaborating is placed entirely on interaction within groups.

Asynchronous 331 has attracted increased enrollment since the spring of 2021, and group work continues to be conducted on Google Docs. In light of the importance that is lent to the assessment of learning outcomes at universities worldwide, utilizing Google Docs as confirmation of effective Student Team Learning can serve as convincing evidence for faculty and administrators advocating for greater resources. Online coursework may never substitute in some ways for work in the classroom, but the present study reveals that, in some ways, work done online can be just as effective pedagogically. In light of the volatility of the contemporary educational milieu, dedicating resources to preparing quality online courses is undoubtedly money well spent.

REFERENCES

[1]   M. A. Long and P. A. Porter, "Group work, interlanguage talk, and Second Language Acquisition," *TESOL Quarterly*, vol. 19, no. 2, pp. 207-228, 1985.
https://doi.org/10.2307/3586827

[2]   C. Szostek, "Assessing the effects of Cooperative Learning in an honors foreign language classroom," *Foreign Language Annals*, vol. 27, no. 2, pp. 252-261 (254), 1994.
https://doi.org/10.1111/j.1944-9720.1994.tb01206.x

[3]   J. C. Cavalier, J. D. Klein, and F. J. Cavalier, "Effects of Cooperative Learning on performance, attitude, and group behaviors in a technical team environment," *Educational Technology Research and Development*, vol. 43, no. 3, pp. 61-71 (63), 1995.
https://doi.org/10.1007/BF02300456

[4]   K. Covington, C. Odom, S. Heflin, and J. Gwyer, "Student Team Learning in practice (STEPs®): An integrated clinical education collaborative model," *Journal of Physical Therapy Education*, vol. 31, no. 2, pp. 18-29 (25), 2017.
https://doi.org/10.1097/00001416-201731020-00004

[5]   D. W. Johnson, R. T. Johnson, and K. A. Smith, "Cooperative Learning: Improving university instruction by basing practice on validated theory," *Journal on Excellence in College Teaching*, vol. 25, no. 3-4, pp. 85-118 (87), 2014.

[6]   T. Pica and C. Doughty, "The role of group work in classroom Second Language Acquisition," *Studies in Second Language Acquisition*, vol. 7, no. 2, pp. 233-248 (247), 1985.
https://doi.org/10.1017/S0272263100005398

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Dr. Kaplan has been awarded a Distinguished Professorship in the Humanities on two occasions (2015-20, 2020-25) at the University of Tennessee in recognition of professional achievement in research and teaching. In 2013, Dr. Kaplan received a National Endowment for the Humanities (NEH) Fellowship, and he has also won a University of Tennessee Alumni Association Outstanding Teacher Award (2010) and a University of Tennessee College of Arts and Sciences Advising Award.

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