

April 2022

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Recommended Citation

Brannan, Lauren R. (2022) "The Effects of Team-based Learning on Preservice Elementary Teachers' Sense of Efficacy for Literacy Instruction," *The Reading Professor*. Vol. 45: Iss. 1, Article 7.

Available at: <https://scholar.stjohns.edu/thereadingprofessor/vol45/iss1/7>

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**The Effects of Team-based Learning on Preservice Elementary Teachers’
Sense of Efficacy for Literacy Instruction**

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Author’s Note

Lauren R. Brannan, Ph.D., is an assistant professor of reading education in the Department of Leadership and Teacher Education at the University of South Alabama where she teaches undergraduate and graduate literacy courses. Her research focuses on instructional design in preservice reading teacher preparation, in-service reading teachers’ learning, and strategies for improving elementary students’ reading comprehension.

Abstract

Teaching efficacy is an important variable related to teaching behaviors, student achievement, and teachers’ psychological behaviors; therefore, strategies to build teaching efficacy during preservice teacher preparation should be implemented. Team-based learning (TBL) has been used across a variety of disciplines in higher education, but it hasn’t been explored in the preparation of elementary literacy teachers or in relation to teaching efficacy. In this study, TBL was implemented in an undergraduate reading methods course for one semester. A comparison group was used from the same course during a different semester using a traditional lecture approach. Participants’ sense of efficacy for literacy instruction scores served as pretest and posttest scores. Although the efficacy scores for both groups increased, results indicated no statistically significant difference between the groups’ posttest scores.

Keywords: team-based learning, efficacy, literacy instruction, preservice teachers, teacher preparation, reading methods, higher education

Today's elementary teachers face classrooms full of students with diverse needs and a set of rigorous literacy standards that their students must meet. The cognitive demands involved require knowledge of the students, knowledge of the literacy content, and knowledge of the pedagogy for teaching the content, as well as the ability to use that knowledge to make complex decisions quickly (Block & Mangieri, 2009; Griffith & Lacina, 2017). With teachers leaving the professions in droves due to burnout, teacher preparation programs must also make sure they are graduating teachers who possess a strong sense of self-efficacy for teaching, or are confident in their teaching ability (Podolsky et al., 2016; Tschannen-Moran & Hoy, 2001). The design and development of high-quality teacher preparation experiences is necessary for graduating teachers who will be successful in their classrooms (Risko & Reid, 2019). In this study, I investigated the impact of team-based learning (TBL), a collaborative and application-based instructional approach, in a reading methods course on pre-service teachers' sense of efficacy for literacy instruction.

Review of Literature

The Importance of Teaching Efficacy

In 1976 a group of RAND organization researchers included two questions in a questionnaire designed for teachers that asked about their ability to impact students' motivation and performance (Armor et al., 1976; Tschannen-Moran et al., 1998). The two items, referred to as teacher efficacy, resulted in correlations with teachers' willingness to implement innovative teaching strategies, teachers' stress levels, and teachers' willingness to stay in the teaching field. Efforts were made to build on those teacher efficacy items to develop a more valid and reliable instrument for measuring teaching efficacy (Tschannen-Moran et al., 1998) using Bandura's

(1977) description of self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3). Describing a more specific type of self-efficacy, Tschannen-Moran and Hoy (2001) defined teaching efficacy as “a judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (p. 783). In other words, teaching efficacy is a teacher’s perception of his or her capability to produce change related to students.

Although teaching efficacy is a teacher’s perceived belief and isn’t necessarily their actual capabilities, self-efficacy has been shown as an important construct to consider for teacher preparation and learning (Tschannen-Moran & Hoy, 2001). Teaching efficacy is related to variables such as teacher behaviors, student achievement, and factors in teachers’ psychological well-being (Kim & Seo, 2018; Zee & Koomen, 2016). It is also context specific (Bandura, 1997). For example, a teacher may have a high efficacy for teaching reading, but a low efficacy for teaching mathematics. Self-efficacy is influenced by mastery experiences, vicarious experiences, verbal persuasion, and emotional and physiological states (Bandura, 1997).

Self-Efficacy and Teachers’ Behavioral Characteristics

Several studies found a relationship between teaching efficacy and teachers’ behavioral characteristics, such as seeking professional learning opportunities, instructional practices implemented, and working collaboratively to make data-driven decisions. Through the use of rigorous structural equation modeling, Geijsel, and colleagues (2009) found that teachers who had higher teaching efficacy were more involved in professional learning activities. This may lead to more efficacious teachers being more knowledgeable. For example, Yildirim and Ates (2012) found that preservice teachers who reported higher teaching efficacy had more knowledge of using expository text as an instructional tool. Depaepe and Konig’s (2018) findings indicated

a strong correlation between self-efficacy and the pre-service teachers' reported instructional practices. Guo and colleagues (2013) found that more efficacious teachers earned higher evaluation ratings in the instructional support domain of the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008). Additionally, more efficacious teachers were found to work collaboratively with colleagues more often on data-driven decision-making tasks (Dunn et al., 2013).

Self-Efficacy and Student Achievement

Although the research results are mixed when looking at the relationship between teaching efficacy and student achievement (Kim & Seo, 2018), some studies have found evidence to support a positive relationship. In one of the earliest studies of teaching efficacy, Ashton and Webb (1986) found that general teaching efficacy and personal teaching efficacy, as measured by the two RAND questionnaire items, predicted student achievement in language and mathematics. In another study, Caprara and colleagues (2006) examined teachers' self-efficacy beliefs as determinants of junior high students' academic achievement using structural equation modeling. They found that when controlling for previous levels of achievement, teachers' personal efficacy effected students' academic achievement. Guo and colleagues (2012) used longitudinal data from the National Institute of Child Health and Human Development (NICHD) and structural equation modeling to explore the effects of teacher efficacy. Their model showed that the students of teachers who reported a higher sense of efficacy exhibited stronger literacy skills. In a context-specific study, Poggio (2012) found that teachers' sense of efficacy for literacy instruction was positively related to gains in student achievement.

Self-Efficacy and Teachers' Job Satisfaction

Data from the Learning Policy Institute (2018) shows that 7.3% of teachers plan to leave the teaching profession, an increase from 6.6% in 2016 (Learning Policy Institute, 2016). With so many educators leaving the field, factors related to teacher burnout are important to explore. Several studies revealed a positive connection between teaching efficacy and teachers' job satisfaction (Caprara et al., 2006; Klassen & Chiu, 2010; Stephanou et al., 2013). Skaalvik and Skaalvik (2010) found evidence of a negative relationship between teaching efficacy and teacher burnout. In a meta-analysis, Kasalak and Dağyar (2020) looked at international data from 50 countries and found a positive relationship with job satisfaction. In other words, teachers who have higher teaching efficacy are more likely to be happier in their teaching positions.

Improving Teaching Efficacy

Preservice teachers' teaching efficacy can be impacted by field experiences and tutoring opportunities (Haverback & Parault, 2008), but how can teacher educators also target preservice teachers' sense of efficacy from within the college classroom? Bandura (1997) posited that self-efficacy is influenced by mastery experiences, vicarious experiences, verbal persuasion, and emotional and physiological states. In the next section, I will describe TBL, an instructional approach involving collaborative problem solving and discussion, which incorporates opportunities for mastery experiences, verbal persuasion, and vicarious experiences. This strategy also provides opportunities to learn the necessary content and to practice using the content in context-specific scenarios.

Team-Based Learning

TBL is an instructional approach in which students work in permanent teams throughout the semester to apply course subject-matter by solving realistic problems related to the topic of study. Research has shown that TBL can impact students' grades, critical thinking skills, and

course satisfaction (Koles et al., 2010; Letassy et al., 2008; Styron & Styron, 2014). However, at the time of this research no studies that investigated the relationships between TBL and teaching efficacy or TBL and elementary reading teacher education were found. Given the attributes outlined in the next section, this approach may serve as an effective method of designing reading methods courses for preservice teachers (Brannan et al., 2019).

Structure of TBL

The structure of TBL, as developed by Larry Michaelson in the 1970s, was designed to engage all students in application activities related to the course content (Michaelson et al., 2004). On the first day of class, students are assigned to semester-long teams, consisting of 5-7 students, in order to evenly distribute varying degrees of experience and background knowledge. The content of the course is divided into approximately four to seven instructional modules. Each module is split into a six-step sequence, consisting of preparation, an individual test, a team test, an appeals process, instructor feedback, and application activities (Michaelson & Sweet, 2008). The remainder of this section will briefly describe each step in the sequence.

Readiness Assurance Process (RAP)

The first steps of the TBL instructional sequence is known as the RAP, which consists of preparation, an individual test, a team test, an appeals process, and a brief lecture or discussion. First, before the first class-meeting of the module, students prepare for the in-class instructional module through readings, videos, and other learning resources (Michaelson et al., 2004). During the first class-meeting of the module, students individually complete a multiple-choice question test, known as an Individual Readiness Assurance Test, or IRAT, which assesses their knowledge of the content acquired through the preparation materials. Once students have completed the IRAT individually, they complete the same test again as a team. This is called the

team readiness assurance test, or TRAT. The TRAT usually involves the use of an IF-AT form (Epstein Educational Enterprises, 2018), a scratch-off answer sheet that provides immediate feedback about whether the correct answer was chosen. After the IRAT and TRAT, the appeals process begins. If the team feels that the content of a test question is conflicting with information from the preparation materials or that a question is ambiguous, the team can file a written appeal to attempt to receive credit for that question. Once the appeals process has concluded, the instructor provides clarifying feedback, related to the test to conclude the RAP.

Applications Activities

After the RAP, the teams engage in application activities provided by the instructor (Michaelsen & Sweet, 2008). This step was designed to provide opportunities for teams to apply their knowledge of the topic at higher-order levels to solve realistic problems. According to Michaelsen & Sweet (2008), each application activity should follow the “4-S” framework in order to maximize student learning. The framework consists of a significant problem or question, the same question is presented to the entire class, a specific choice for each team to make, and each team reports their choice simultaneously. For example, after providing assessment data to the class, the instructor poses the following multiple-choice question to the class: “Given the assessment data, which of the following reading skills does the student struggle with most?” Each team would then engage in discussion and further analysis of the data to arrive at a decision. Upon the instructor’s signal, all teams hold up the letter card of their answer choice. Each team then presents their rationale and the class engages in discussion across teams until arriving at the best answer. The role of the instructor is to facilitate discussion through prompting and questioning. For each module, application activities usually occur for two to three weeks and

increase in rigor and become more complex. At the conclusion of the module, assessment usually occurs and the cycle will repeat for a new module.

Peer Evaluation

Since the quality of learning in the TBL setting is dependent on the dedication and participation of all team members, team members need to be held accountable for contributing to their team. This is accomplished through the peer evaluation process (Baker, 2008; Cestone et al., 2008). Peer evaluation can occur as often as needed throughout the course, but is often used at midterm and at the end of the course. Several models of peer evaluation were cited in the TBL literature, including quantitative, qualitative, and mixed approaches of rating and describing each team member's contribution to the team (Levine, 2008; Michaelsen & Fink, 2004; Ohland et al., 2012; Szatkowski & Brannan, 2019).

Connecting TBL to Teaching Efficacy

As previously discussed, Bandura (1997) described several sources of self-efficacy, with mastery experiences as the most powerful source. The components of TBL may promote some sources of self-efficacy. In a TBL module, preservice teachers can gain mastery experiences when their team successfully solves a literacy problem posed by the instructor. This could also occur as the team completes the TRAT. As preservice teachers answer each question, they receive immediate feedback through the IF-AT form. If they select the correct answer, they have gained a mastery experience. Another important source of self-efficacy are vicarious experiences, or observations of others' success (Bandura, 1997). The application activity process can provide vicarious experiences through observing other teams successfully solve problems posed by the instructor. Not only do the teams get to see other teams' success, but they get to hear the team's rationale and method used to solve the problem. Mastery experiences and

vicarious experiences can occur in a similar fashion within teams as each team member contributes to the discussion.

Purpose and Significance

Given the connections between sources of self-efficacy and TBL, I hypothesized that preservice teachers who participated in TBL during their reading methods course will have a higher sense of efficacy for literacy instruction, as compared to peers in a different section of the same course who received traditional instruction. The purpose of this study was to explore the impact of using TBL in a reading methods course on preservice elementary teachers' sense of efficacy for literacy instruction. The results of this study will add to the bodies of research about TBL and elementary preservice teachers' teaching efficacy, as the two variables have not yet been explored together.

The following research question guided this study:

1. Do preservice teachers who participated in TBL during their reading methods course have a higher sense of efficacy for literacy instruction, as compared to peers in a different section of the same course who received traditional instruction?

Method

Since participants could not be randomly assigned to groups, a nonequivalent comparison group design was used to assess whether preservice teachers who completed a literacy course using TBL have a higher sense of efficacy for literacy instruction than preservice teachers who completed a literacy course using traditional lecture. During the fall semester, participants in the treatment group experienced TBL for the entirety of the course, then in the spring semester, the comparison group experienced traditional lecture for the entirety of the course. The same instructor taught both groups of participants. Students in both sections of the course were

assigned to an elementary classroom for field experience three days per week during the semester. The categorical independent variable was the instructional approach (TBL and lecture), the covariate was the sense of efficacy for literacy instruction pretest score, and the dependent variable was sense of efficacy for literacy instruction posttest score.

Participants

Participants included 47 junior and senior undergraduate preservice teachers enrolled in education course focused on methods for teaching reading, including 30 (29 female and 1 male) participants in the treatment group and 18 participants (all female) in the comparison group. The participants attended a university in the southeastern United States and were enrolled in a dual certification program for Elementary Education and Special Education. The program included two literacy courses; the first course was titled, Foundations of Reading, and the second course was titled, Teaching Reading. The first course taught students the content knowledge of reading, while the second course focused on the pedagogy for teaching reading and writing. Participants for this study were enrolled in the second course.

Instrument

The Teachers' Sense of Efficacy for Literacy Instruction Scale (Tschannen-Moran & Johnson, 2011) was used to measure preservice teachers sense of efficacy for literacy instruction and served as the pretest and posttest. The scale was developed by Tschannen-Moran and Johnson (2011) to provide a content-area specific measure of teachers' sense of efficacy, compared to the more general Teachers Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001). The authors reported construct validity with all 22 items loading on a single factor; reliability was reported through a Cronbach's alpha of .96 (Tschannen-Moran & Johnson, 2011). This scale has been used with preservice teachers. (Martin, 2012).

Procedures

Prior to the first day of class, participants provided informed consent to participate in the study and completed a paper-based pretest. The fall semester course was taught using the TBL approach (treatment group) and then the spring semester course was taught using the traditional lecture approach (comparison group). All participants completed the paper-based posttest on the final day of the course.

The course was arranged into four modules, titled assessment, word study, methods of supporting young readers, and methods of supporting young writers. Each module for the TBL group was preceded with preparation activities, which included a list of learning objectives, video lectures, and assigned readings from the textbook. The RAP occurred during the class meeting, which included the IRAT and TRAT, based on the preparation materials. The comparison group received the same online objectives, video lectures, and assigned readings, but did not participate in the RAP. In lieu of the RAP participants in the comparison group completed online quizzes based on the preparation materials.

After completion of the second module, word study, each team of participants in the TBL group completed peer evaluation using the student-driven peer evaluation method (Szatkowski & Brannan, 2019). This method of peer evaluation required participants to rate each of their team members against a set of criteria that were created by the class at the beginning of the semester using an electronic form. Participants had to justify each rating with an explanation. The scores were calculated and the feedback was compiled for each participant by the course instructor, and then the participants received their overall score and anonymous feedback. The peer evaluation process was completed again on the last day of class. Participants in the comparison group did not participate in peer evaluation.

Each week, participants in the TBL group took part in application activities which required them to apply the knowledge and skills learned during the RAP. The application activities were presented on an interactive whiteboard included a realistic problem with a specific answer that each team had to work together to solve. Teams selected a specific answer choice and, upon the signal, reported their answer all at once. Reporting styles included multiple-choice cards, written answers on small white boards, and color-coded sticky notes during a gallery walk. The answers were compared, discussed, and rationalized by each team. The instructor served as a facilitator of discussion by prompting students with questions and other considerations. Finally, all teams would reach a consensus about the answer. Each application activity varied in the amount of time spent, but ranged from about five to 30 minutes. Figures 1 and 2 show examples of application activities from the Word Study module. Participants in the comparison group participated in traditional lecture-style instruction and occasional hands-on activities.

Figure 1

Sample Application Activity Using Multiple Choice Cards to Respond

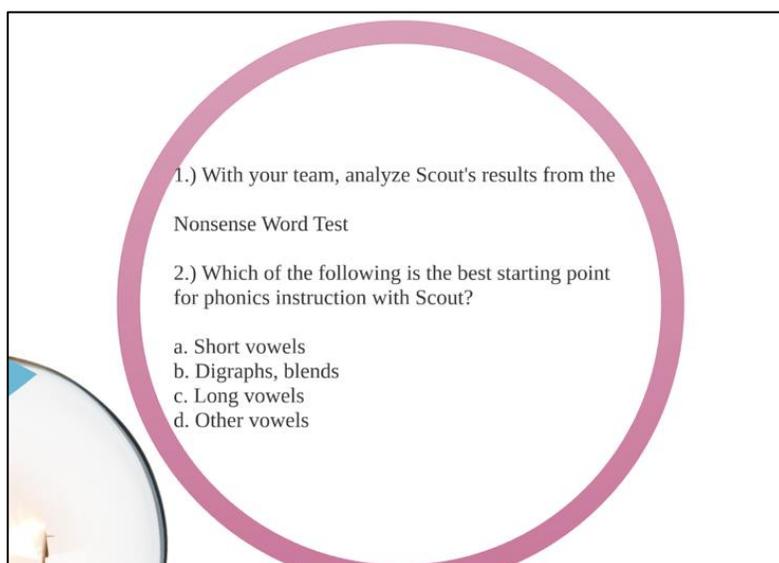


Figure 2*Sample Application Activity Using Sticky Notes During a Gallery Walk*

Participants in both classes completed the same field-based assignments. These assignments included planning a phonics lesson and two days of comprehension and then teaching their plans in their assigned field placement. One assignment was ongoing and included selecting a struggling reader, conducting a series of assessments, planning and teaching intervention plans, and then conducting a second round of assessments to measure growth. All participants were assigned a supervisor from the university, who observed their lessons and provided constructive feedback.

Results

To control for initial efficacy differences between the groups, an independent samples t test was conducted to determine whether the pretest scores of TBL group and the lecture group differed significantly. The results of the t test showed that the two groups differed significantly on their pretest scores, $t(50) = 5.11, p < .001$, with the treatment group ($M = 141.18$) having

higher scores than the comparison group (95.17). These results indicated the need for using the pretest scores as a covariate in the comparison of the two groups' posttest scores.

Exploration of the data indicated a small sample size with unequal groups, but there was no substantial departure from normality on pretest or posttest scores for either group. However, due to unequal sample sizes and a violation of the assumption of equal regression coefficients between groups during a one-way ANOVA, a nonparametric test, Quade's rank ANCOVA, was conducted to examine statistically significant differences between the two groups on the posttest scores, controlling for pretest scores. The Quade's rank ANCOVA revealed that there were no statistically significant differences between the posttest scores of the treatment group and control group, $F(1, 45) = .009, p = .92$. Therefore, the null hypothesis of finding no difference between the groups was not rejected. Means and standard deviations for both groups for the pretest and posttest are included in Table 1.

Table 1

Means and Standard Deviations for Pretest and Posttest Scores

| Group | Pretest | | Posttest | |
|---------|----------|-----------|----------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| TBL | 141.18 | 31.71 | 171.73 | 20.08 |
| Lecture | 95.17 | 29.20 | 166.82 | 16.82 |

Discussion

The review of literature described Bandura's (1997) idea that mastery and vicarious experiences lead to growth in self-efficacy. In this study, I hypothesized that a reading methods course using TBL would provide mastery and vicarious experiences to preservice teachers

through the RAP and application activities, and therefore, preservice teachers in the TBL group would have a higher sense of efficacy for literacy instruction than preservice teachers receiving traditional lecture-style instruction at the end of the course.

The results showed no statistically significant difference between the efficacy posttest scores for the TBL and lecture groups at the end of the semester. This may be due to a couple of factors. First, the duration of one semester may not have been enough time for participants to build a higher sense of efficacy. This finding was also seen in a study by Ciampa and Gallagher (2018), who investigated Canadian and U.S. preservice teachers sense of efficacy for literacy instruction over the course of one semester. They did not find a significant change in their participants' efficacy beliefs. As seen in a study by Kent et al. (2013), efficacy can take several semesters to grow. Secondly, participants in both groups were engaged in field experiences for two days each week, which may have caused an interaction in their sense of efficacy. During field experience hours, the participants observed literacy instruction, assessed components of reading, provided reading intervention to a struggling reader, and planned and taught whole class literacy lessons, including phonics, vocabulary, and comprehension in an assigned elementary classroom, alongside a certified cooperating teacher. These field experiences provided both vicarious experiences and mastery experiences, which may have had a greater impact on participants' efficacy than the mostly in-class TBL experience, thus eliminating any differences in efficacy between the two groups. Results from a study by Haverback and Parault (2008) showed that field experiences and tutoring, such as those described in the present study, impacted preservice teachers' sense of efficacy. This is consistent with a study by Leader-Janssen and Rankin-Erickson (2012), who concluded that preservice teachers needed supported teaching opportunities to increase the chance of mastery experiences and thus increase self-

efficacy. Thirdly, preservice teachers have been shown to be overly confident, or efficacious early on in their program of study. In fact, studies have shown that pre-service teachers sometimes had a higher sense of teaching efficacy than in-service teachers (Benz et al., 1992; de la Torre Cruz & Casanova Arias, 2007). The results from the present study possibly resulted from participants rating their efficacy higher at the onset of the course, but once confronted with the realities of the teaching profession through their field experiences, more accurately rated their efficacy at the end of the semester.

The findings from this study provide evidence that when used in reading methods courses TBL may be as effective as traditional lecture in building preservice teachers' sense of efficacy for literacy instruction, an important variable for job satisfaction and teacher retention. Caprara and colleagues (2006) surveyed over 2000 teachers and found that efficacy was positively related to their job satisfaction. Similarly, Stephanou and colleagues (2013) found that teachers' personal self-efficacy had a positive effect on the collective efficacy of the school and on teachers' job satisfaction.

Identifying strategies that can positively impact teachers' sense of efficacy for literacy instruction is important because there is evidence that is related to student achievement (Ashton & Webb, 1986). Poggio (2012) saw gains in reading achievement. Guo and colleagues (2012) found that teachers who have higher sense of efficacy provide a more supportive, positive environment and that their students had better performance in literacy. On a larger scale, Goddard and colleagues (2000) found that collective teacher efficacy, the perceptions of teachers within the same school, was positively associated with student achievement in both reading and math.

Future research should compare preservice teachers' sense of efficacy for literacy instruction in a TBL course and in a course using traditional teaching methods using more rigorous research designs with larger sample sizes and random assignment. Furthermore, integrating qualitative feedback from the students may help paint a clearer picture of the possible relationship between TBL and teaching efficacy. Other important variables to consider are the impact of TBL on preservice teachers' content knowledge, critical thinking skills, and teaching performance.

This study contains several limitations that should be considered when interpreting the results. First, the nature of self-report to measure participants sense of efficacy for literacy instruction may contain biases, such as reporting results that may seem socially desirable. A second limitation of this study was its sample size, which was a small convenience sample, that limits the generalizability of the results. Yet another limitation was the short span of time in which the study was conducted. While TBL has been studied in a variety of other fields, there is very little mention of it in the literature of for educator preparation, making it a useful topic for future research.

Conclusions

While many factors contribute to the effectiveness and retention of literacy teachers, sense of efficacy for literacy instruction is an important factor to consider when making programmatic and instructional decisions in teacher preparation. The results of this research provide evidence of an instructional approach, TBL, that may have a positive impact on preservice teachers sense of efficacy for literacy instruction. Further research is needed to provide additional evidence of the impact of TBL on preservice teachers' sense of efficacy for literacy instruction.

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