# An Examination of Learning Formats on Interdisciplinary Teamwork Knowledge, Skills, and Dispositions

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Although interdisciplinary teamwork is a recommended practice and important for coordinated interdisciplinary programming in special education, there is limited research on pedagogical practices to prepare professionals to work together effectively. This study examined the effectiveness of a graduate interdisciplinary teamwork course taught through two distinct learning formats (week-long face-to-face and hybrid) on graduate students' teamwork knowledge, skills, and dispositions. Using the How People Learn framework (National Research Council, 2000), further analysis was conducted to consider the relationship of students' prior teamwork experiences to their entry-level knowledge and satisfaction with course features. Results indicated that students in both learning formats reported improvements in teamwork knowledge and skills; however, differences in learners' prior experiences and their satisfaction with the course, course structure, assignments, and activities was found. Further examination of pedagogy is needed to characterize how professionals are prepared with knowledge, skills, and dispositions for effective teamwork.

**Keywords:** interdisciplinary teamwork, teaching teamwork, higher education, pedagogy, learning formats, hybrid

Interdisciplinary teamwork is an essential component to the provision of services in the health care and education environments (Friend & Cook, 2010; Greiner & Knebel, 2003; Oandasan et al., 2004). In the healthcare system, effective teamwork is integral to improving the quality of patient outcomes, enhancing patient and workplace safety, and increasing job satisfaction among healthcare professionals (Oandasan et al., 2004). Likewise, effective teamwork is an effective catalyst for creating an exemplary school environment and maximizing positive outcomes for students (Giangreco, Edelman, Luiselli, & MacFarland, 1998; Hunt, Soto, Maier, Liboiron, & Bae, 2004; McLaughlin, 2002). Although research identifies the needs and value of interdisciplinary teamwork in professional practice and preparation programs, the specific content and pedagogy have not been described.

Interdisciplinary teamwork is widely recognized in legislation and best practice policy, and should be an integral component of professional preparation for all disciplines. This is particularly pertinent to special education as the most recent reauthorization of the Individuals with Disabilities Education Improvement Act of 2004 mandates interdisciplinary teamwork in several areas—assessment, development and implementation of individualized education programs, education in the least restrictive environment, discipline and behavior support plans, and transition services (Hanft & Shepherd, 2008). The No Child Left Behind Act of 2001 also conveys the importance and necessity of collaboration and cooperation to achieve improved educational outcomes for all students (Handler, 2006).

Moreover, many professional organizations affirm the importance of teamwork and collaboration in serving students with disabilities. According to the Council for Exceptional Children (2009), collaboration is one of ten common core professional practice standards for all special education teachers, with emphasis on knowledge of collaboration models and strategies, roles, and communication with families, school and community personnel. Teamwork and collaboration are also included in the code of ethics, standards, or practice statements for other professional organizations, including the National Association of Social Workers (2008), the American Occupational Therapy Association (2010), the American Physical Therapy Association (2009), and the American Speech-Language-Hearing Association (2008). Special education literature emphasizes collaborative teamwork and problem solving for instructional programs, particularly for the inclusion of students with disabilities in the general curriculum, which depends on effective integration of multiple disciplines (Dettmer, Thurston, Knackendoffel, & Dyck, 2009; Friend & Cook, 2010; Hunt, Soto, Maier, Liboiron, & Bae, 2004).

Despite the importance of interdisciplinary teamwork from legal and professional standard perspectives, professional preparation continues to occur within discipline specific programs focused on training professionals on their individual roles, skills, values, and theoretical perspectives. In a study by Mellin and Winton (2003), it was reported that only 7% of faculty time was spent on interdisciplinary preservice teaching and further noted that collaboration is not a part of the instructional strategies used in preservice education. This finding is confirmed in other studies. In fact, the most recent nationally representative survey on personnel preparation in special education found only 53% of special education teachers and 29% of general education teachers received content on collaboration in their preservice education (Carlson et al., 2002).

Evaluations of interdisciplinary personnel preparation programs have revealed that program graduates report frequent opportunities in practice to use teamwork skills and to develop confidence in their abilities to communicate and collaborate with families and other professionals due to their interdisciplinary training (Chen, Klein, & Minor, 2009; Crais et al., 2004). Researchers also report a need for an education system that supports interdisciplinary, collaborative practice (Lerner, Magrane, & Friedman, 2009; Oandasan et al., 2004; Rodger & Hoffman, 2010; Thistlethwaite & Moran, 2010). Nevertheless, the concern of Moore, Fifield, Spira, and Scarlato (1989) persists 22 years later: “a recurrent theme in the literature on team decision making in special education is the general absence of training in the dynamics of group process” (p. 52). Thus, having a common knowledge base of interdisciplinary teamwork is critical because of its influence on later practice.

In addition to the call for teaching teamwork, there is an increasing shift from traditional teaching formats to providing instruction through different means, including modified schedules and blended instruction. Modified schedules, such as intensive, weekend, or evening courses, accommodate the needs of working students, while online and blended instruction models promote self-directed learning, can meet the needs of students across a greater geographical region, and prepare them for the realities of online collaboration in their careers (Lim & Yoon, 2008). Blended instruction models, also called hybrid, involve a mix of traditional face-to-face course time with online learning technologies (Lim & Yoon, 2008). The purpose of this study was to evaluate the effectiveness of two distinct learning formats (hybrid and week-long face-to-face) in promoting student learning outcomes related to interdisciplinary teamwork.

## Study Context

At a large urban university, interdisciplinary teamwork courses were established because of interdisciplinary grants and university-affiliated programs designed to support people with developmental disabilities. Over time, the courses evolved, but the premise remained the same. This is clearly articulated by Garner and Orelove (1994).

> In addition to learning and practicing the knowledge and skills of their highly specialized disciplines, all professionals now need to learn how to be a member of a team, which involves skills such as communicating effectively with others, collaborating in problem solving and decision making, and maximizing the benefits of the overlap among the helping professions. (p. xii)

## Course Formats and Teaching Strategies

This study focused on the required interdisciplinary graduate course affiliated with two grant-supported personnel development programs, which were offered in different semesters with distinct learning formats. Both courses were team taught, with the first author teaching both courses alongside a faculty member from the respective grants. Course 1 focused on preparing school nurses for work with students with disabilities. This course was developed to meet the needs of the students supported by the grant, who were working professionals in school systems and who were affiliated with universities across the state. In response, this course was developed for the grant and provided in a central location with a shortened course schedule during the summer. Course 2 was taught weekly over one semester in a hybrid format (with ten face-to-face class meetings and six online modules). This course was developed in response to national and university priorities for developing online and distance learning opportunities. Participants in this course completed the course as required by a personnel development grant (focused on leadership in working with students with developmental disabilities and their families). Both courses (Course 1 and Course 2) enrolled students from other disciplines not involved in the personnel development grants.

Both interdisciplinary courses had the same instructional and learning objectives—to promote teamwork knowledge acquisition, skill development, and commitment for effective interdisciplinary services for students with disabilities and their families. These courses were designed to build foundation knowledge of specific team processes, teamwork models, team development, meetings, communication, decision-making, and problem solving through readings, lectures, and demonstrations. Class experiences provided application opportunities within interdisciplinary student teams that were continuous throughout the course and configured to represent the diversity of students' disciplines and experiences.

All student teams completed a case-oriented project on current issues in special education and developmental disabilities, such as inclusion, accountability, and challenging behavior. As projects progressed, teams were prompted to use effective team process skills (e.g., agendas and assigned roles) via faculty observation and feedback as well as self-reflection. Students also completed several individual assignments, including interviewing a professional from another discipline and writing a final reflection paper about individual and team development. Although

students were graded on these assignments, these assignments were not analyzed as part of this study.

Both courses were guided by the How People Learn (HPL) framework, which identifies four lenses as critical to effective learning environments (National Research Council, 2000). The learner centered lens considers prior experiences, culture, and existing knowledge, skills, and attitudes as a starting point for teaching and learning. The knowledge lens focuses on teaching strategies and learning opportunities for the development and application of deep knowledge. The assessment lens highlights frequent opportunities for students and teachers to monitor teaching and learning throughout the learning process. The community lens emphasizes social learning opportunities that provide ongoing challenge and scaffolding to promote meaningful learning. Table 1 illustrates the relationship of the learning activities and measurement methods to the HPL framework.

**Table 1**
**Teamwork Teaching Strategies and Measures**

| HPL Lens | Teamwork Instructional Activity | Teamwork Measure |
|---|---|---|
| Learner centered | Reflection on prior experience | Student background survey<br>Self Assessment of Teamwork Skills (pre-test)<br>Alexander Case Study (pre-test on family-centered attitudes) |
| Knowledge centered | Disciplinary perspectives<br>Team strategies | Discipline interview report<br>Team Profile (Olson & Murphy, 1999) |
| Assessment centered | Observation of Teams | Faculty feedback on specific skills<br>Self Assessment of Teamwork skills (post-test)<br>Reflection paper |
| Community centered | In-class team meetings<br>Team case projects | Faculty led feedback on Team Profile<br>Student and faculty feedback |

Again, the purpose of the study was to examine the effectiveness of two learning formats in teaching interdisciplinary teamwork. Learning outcomes were examined by analyzing changes in participants' teamwork knowledge, skills, and dispositions, as well as their perceptions about the course effectiveness across two course delivery formats.

## Method

The study was conducted following approval from the university institutional review board. The second author, who was not an instructor for the courses, presented information on the study to all students and conducted the informed consent on the first day of the courses. Students were given a choice as to whether data was used for the research study, without the instructors having knowledge of their decision as all study materials were collected as part of course assignments. Informed consents were not released to the course instructor until course grades were submitted to reduce perceived potential risks related to participation effect on course grades.

This study was conducted during consecutive semesters with a total of 35 graduate students (19 in Course 1 and 16 in Course 2). Initially, students were surveyed for background information about their disciplines, prior teamwork experiences, and current roles. Two pre-post measures, *Self Assessment of Teamwork Skills* (adapted from Garner, n.d.) and the *Alexander Family Case Study* (Snyder & McWilliam, 1999) were used to examine perceived and demonstrated changes, respectively, in teamwork knowledge, skills and dispositions. Finally, students provided feedback about course structure, experiences, and learning outcomes through end of course evaluations. Measures were administered to all students; however, some students did not complete some measures or items, which resulted in missing data. Analyses included all of the available data to more fully characterize the range of students' outcomes and perspectives.

**Self Assessment of Teamwork Skills.** This 45-item self-assessment was adapted from Howard Garner (n.d.), for students to reflect on and evaluate their own teamwork skills. Students rated themselves on team skills at the beginning and end of the course. Ratings are based on a 6-point Likert type scale, ranging from *very skilled* (1) to *not at all skilled* (5), with (6) being unsure of the skill. The self-assessment measures teamwork competencies, including communication skills, decision making, conflict management, and role formation. Internal consistency reliability estimate, Cronbach's alpha, was .98 for the study sample.

**Alexander Family Case Study.** This short case study and 42-item questionnaire (Snyder & McWilliam, 1999) measures skills in applying family-centered principles. Specifically, it examines professional dispositions about family team members' concerns with professionals and intervention methods, as well as maternal stress. Responses for each statement are rated along a 5-point Likert type scale, with the student rating practices which (1) they *definitely would not do* to (5) those which they *definitely would.* An overall score is derived from the sum of all item scores, with higher scores indicating superior family-centered application skills. Concurrent validity of the Alexander Family Case Study was established in relationship to another family centered questionnaire, *Issues of Early Intervention* (Humphry & Geissinger, 1993; P. J. McWilliam, personal communication, September 22, 2008). Initial reliability estimates of .82 were reported by Snyder and McWilliam (1999) in a study of 67 graduate students in an interdisciplinary family course. In the present study, the Cronbach alpha was .77 for the sample.

**Course Feedback Form.** The Course Feedback Form consisted of 14 Likert-type scale questions and several open-ended questions. Responses for the Likert-type scale questions ranged from *strongly agree* (1) to *strongly disagree* (6). These items focused on overall ratings of the course (course satisfaction and willingness to recommend this course to others), instructional value of

specific course assignments and activities, and the course format. Open-ended questions solicited overall comments on activities and assignments, readings, knowledge gained, areas of strength, and areas for improvement.

## Results

Course 1 (face-to-face) students represented five disciplines (Table 2) with 15.11 mean years (*SD* 10.5) experience. Eighteen of the nineteen students were currently working in their disciplinary field and had direct work experience in special education. Course 2 participants represented six disciplines and included one family member, with a mean of 4.62 years (*SD* 5.0) of previous experience. During the course, two participants were working in their fields and twelve were fulltime students, with five having previous experience in special education, but not currently working in the field.

**Table 2**
**Participants' Disciplines and Prior Teamwork Experience**

| Disciplines | Frequency | Mean # Years Experience |
|---|---|---|
| Course 1 | | |
| Nurse | 8 | 19.4 |
| General education teacher | 6 | 12 |
| Special education teacher | 2 | 15 |
| Social worker | 2 | 10.5 |
| Related service provider | 1 | 9 |
| Subtotal | 19 | |
| Course 2 | | |
| Nurse | 5 | 1.6 |
| Special education teacher | 3 | 7.3 |
| Genetic counselor | 3 | 1 |
| Related service provider | 2 | 8 |
| Psychologist | 1 | 15 |
| Social worker | 1 | 4 |
| Family | 1 | 6 |
| Subtotal | 16 | |
| Total | 35 | |

On a pre-course student background survey of teamwork skills, Course 1 and Course 2 students reported current and previous professional teamwork experience. Course 1 students reported statistically significant higher use of agendas ($t = 2.12$, $p = .04$) and use of a recorder ($t = 3.91$; $p = .00$) in previous teams than Course 2 students. Overall, Course 1 students rated their previous teamwork experiences more positively than students in Course 2 ($t = 2.15$, $p = .04$).

Changes in pre- and post-test scores on the *Alexander Case Study* and the *Self Assessment of Teamwork Skills* were used to analyze changes in participants' teamwork knowledge, skills, and dispositions. *Alexander Case Study* scores increased for both classes, but with no significant change in students' application of family-centered principles to the specific case (Table 3).

**Table 3**
**Overall Mean Score, Standard Deviations, and Differences Across Courses Between Pretest and Posttest Alexander Case Study**

| | Pretest | | | Postest | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Mean | *SD* | *N* | Mean | *SD* | Mean Difference | *t* | *p* | Effect |
| Course 1 | 13 | 123.38 | 6.54 | 13 | 124.46 | 8.48 | 1.08 | .492 | .632 | .14 |
| Course 2 | 12 | 128.08 | 12.84 | 12 | 131.42 | 6.08 | 3.34 | .948 | .364 | .33 |
| Total | 25 | 125.64 | 10.14 | 25 | 127.80 | 15.86 | 2.16 | 1.08 | .292 | .16 |

*Based on a scale from 1 (definitely would not) to 5 (definitely would). p <.05*

Analyses of the dependent *t*-test pre-and post-test scores for the *Self Assessment of Teamwork Skills* revealed significant changes in students' self-assessments, with both student groups rating their skill levels higher on the posttest (Table 4).

**Table 4**
**Overall Mean Scores and Differences Between Courses' Pretest and Posttest Self-Assessment**

| | Pretest | | | Postest | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Mean | *SD* | *N* | Mean | *SD* | Mean Difference | *t* | *p* | Effect |
| Course 1 | 11 | 100.18 | 22.51 | 11 | 82.64 | 25.37 | 17.54 | 2.33 | .042 | .73 |
| Course 2 | 9 | 121.67 | 30.74 | 9 | 100.56 | 29.21 | 21.11 | 2.37 | .045 | .70 |
| Total | 20 | 109.87 | 28.01 | 20 | 90.70 | 19.17 | 19.17 | 3.41 | .003 | .69 |

*Based on a scale from 1 (very skilled) to 5 (not at all skilled) and 6 (unsure of skill). p < .05*

Analyses of course feedback showed statistically significant differences across classes regarding course format (satisfaction, recommended model, and convenience; Table 5). Students in Course 1 (face-to-face) were more likely to express satisfaction with the course and its structure as well as course methods to teach teamwork and assignments. Participants commented on the convenient course schedule, face-to-face interactions, and value of learning experiences. Students in Course 2 (hybrid) agreed that sufficient time was scheduled; however, overall course satisfaction and course structure appraisals were neutral. Students reported dissatisfaction with online course components, and expressed confusion with location of online materials and assignment submission procedures as well as difficulty with online discussions (e.g., "I have difficulty

debating online. I prefer in-class debates"; "the discussion boards get really lengthy…people end up saying the same things over and over and I didn't find it very beneficial"). Others noted lack of self-motivation to use online resources unless required as well as low engagement in online discussion of readings. A few students made positive comments about the online format, especially that the self-paced nature of the format allowed greater reflection and opportunities for balanced participation (such as "the louder students would probably dominate" in-class discussions).

**Table 5**
**Overall Mean Scores, Standard Deviations, and Differences Between Course Feedback**

| | Course 1 | | | Course 2 | | | | |
|---|---|---|---|---|---|---|---|---|
| | *N* | Mean | *SD* | *N* | Mean | *SD* | *t* | *p* |
| Overall Course | | | | | | | | |
| Overall I was satisfied with activities | 18 | 1.17 | .514 | 13 | 3.08 | 1.115 | 6.41 | <.0001 |
| I would recommend this course | 19 | 1.11 | .315 | 13 | 3.54 | 1.127 | 8.96 | <.0001 |
| I would recommend the format | 19 | 1.37 | .761 | 13 | 2.77 | 1.166 | 4.12 | .0003 |
| I learned valuable approaches | 19 | 1.11 | .315 | 13 | 2.62 | 1.193 | 5.29 | <.0001 |
| The activities helped me learn new approaches to teamwork | 19 | 1.00 | .000 | 13 | 2.77 | 1.013 | 7.6 | <.0001 |
| The level of team interaction was high | 19 | 1.05 | .229 | 13 | 2.46 | 1.127 | 5.33 | <.0001 |
| Total Course Satisfaction | 18 | 1.14 | .310 | 13 | 2.87 | .926 | 7.43 | .000 |
| Instructional Strategies & Activities | | | | | | | | |
| Sufficient time scheduled | 19 | 1.53 | .772 | 13 | 1.85 | 1.114 | 0.96 | .3437 |
| Class was convenient to me | 19 | 1.32 | .820 | 13 | 2.31 | 1.316 | 2.63 | .0134 |
| Parent panel was a good experience | 18 | 1.50 | .857 | 11 | 3.45 | 1.695 | 4.12 | .0003 |
| Team assignment | 19 | 1.11 | .315 | 13 | 2.54 | .776 | 7.25 | <.0001 |
| Discipline interview | 19 | 1.95 | 1.22 | 13 | 2.92 | 1.320 | 2.14 | .0409 |
| Reflection paper | 9 | 1.33 | .707 | 13 | 2.62 | .961 | 3.43 | .0027 |
| Total Instructional Strategies & Activities | 9 | 1.59 | .791 | 11 | 2.56 | .905 | 2.52 | .022 |

Scale: *strongly agree* (1) to *strongly disagree* (6)
$p < .05$

Even though class activities and assignments were identical across the courses, Course 1 (face-to-face) students consistently rated items more favorably than Course 2 (hybrid) participants. Both courses were responsible for completion of a team presentation based on a case study. Course 2 comments centered on not having specific guidelines on the case presentation, while Course 1 feedback described the assignment as "very effective" and "challenging and difficult at times, but most rewarding" and "very educational." Statistically significant differences were also evident in ratings of other assignments.

Data were also analyzed for differences in participant characteristics, teamwork competencies, and course ratings across the two classes. Years of experience in their current profession varied across classes, as Course 1 (face-to-face) participants had more experience than Course 2 (hybrid) students. Current professional experience was also different across groups. Only two Course 2 participants (5.71%) were actively working in their professional setting while taking the

interdisciplinary class, five full-time students (14.29%) were no longer working as professionals, and 23% were not currently working primarily with children with disabilities in a school or other direct setting, nor anticipated future roles. This was reflected in course evaluations, such as "I still do not see why my discipline is required to take this course." This contrasted sharply with the week-long course in which 91.4% of the course participants were actively working with children with disabilities in their professional settings, and the remaining 8.6% expected to work with students with disabilities upon graduation.

## Discussion

Results show differences between the two interdisciplinary courses, particularly in the areas of learners' prior experience and learners' satisfaction with the course, course structure, assignments and activities; improvements in teamwork knowledge and skills; and use of technology. Students with more extensive, relevant work experience were more satisfied with the pedagogy and format and rated their learning outcomes positively. Specifically, they rated the course activities and assignments as more valuable learning experiences. This raises questions about the needs of novice learners (those with little prior knowledge or content understanding) to acquire a conceptual framework and a substantial body of knowledge prior to transferring that knowledge into practice (National Research Council, 2000). These courses presented teamwork content, but also required learners to practice those skills frequently. Experienced practitioners have an existing knowledge framework and motivation to learn relevant skills, which facilitates their acquisition and transfer of new knowledge. These learner characteristics may explain why experienced students in Course 1 found the learning activities useful for deeper learning and understanding, while students in Course 2 lacked the experiential basis for understanding the rationale for learning teamwork skills.

Despite these findings, students in both classes judged that they improved in their teamwork knowledge and skills, with Course 2 (hybrid) students seeing more improvements than Course 1 (face-to-face) students. Course 2 students' perceptions of growth could be a function of having less experience (with more room for growth) rather than an indication of different effects of learning formats; however, the format effects (face-to-face vs. hybrid) need to be examined across groups with similar backgrounds to investigate this further. Because improvements were seen for both classes, the readings, course materials, assignments and activities in either format seem to promote growth in teamwork knowledge and skills.

Learner satisfaction with the interdisciplinary course was hampered by technology problems for Course 2 participants who expressed concerns about their personal computer access to the Internet and slow download speeds. The structure of Course 1 (face-to-face) was rated significantly higher than Course 2 (hybrid). Course 2 participants strongly favored face-to-face classes over online modules. This may be due to the high number (75%) of full-time traditional students in this course, as previous online learning experience influences perceptions of student satisfaction (Bradford & Wyatt, 2010). It also raises the question of whether learning about team communication and conflict resolution is better supported by face-to-face interactions, where visual and auditory cues are a significant aspect of learning about team members.

## Limitations of the Study and Implications for Interdisciplinary Teaching and Learning

*Limitations*

Because this study involved a small number of participants in two courses from the same university, our findings may not be generalized to other programs. Also, since participants in the two courses differed in several ways (experience, knowledge, and nature of participation), differences between the courses may not be related to the courses but to differences between participants, making it difficult to attribute participant changes to courses alone. Finally, because many of the participants in this study were also involved in other courses within their disciplines, some of the identified differences may be attributed to prior or concurrent training.

*Implications for Interdisciplinary Teaching and Learning*

Teamwork is an essential practice standard for personnel involved in education for children and youth with disabilities. Instruction on teamwork should take into account the learners' background and experiences for planning through the use of activities to develop metacognition or through opportunities for real-life experiences. For students with little work experience, opportunities to develop application skills should be considered. Real life contexts or experiences, such as clinical practice and service learning, have been shown to be effective for team learning (Cook, 2005; Oandasan & Reeves, 2005). Learning experiences should also be informal as well, allowing time for interaction between team members and different professionals to exchange knowledge (Hall & Weaver, 2001; Oandasan & Reeves, 2005). Concurrently, students should be guided in the development of their metacognitive skills to help them make meaning of their experiences as helping learners become more active monitors of their learning facilitates their performance (Hammerness et al., 2005). Therefore, emphasis on reflection about learning goals, experiences, and changes in skill, reflective prompts, and journal entries are essential instructional strategies (D'Eon, 2005; Gallagher, Vail, & Monda-Amaya, 2008).

Further examination of pedagogy is needed to characterize how professionals can be prepared with the knowledge, skills, and dispositions for effective teamwork. Broadly, this research could examine alignment of teamwork content, targeted learning outcomes, and professional standards, as well as teaching and assessment methods for specific teamwork skills (Thannhauser, Russell-Mayhew, & Scott, 2010; Thistethwaite & Moran, 2010). Efficacy studies about curricular formats (independent course vs. embedded modules throughout the curriculum) or curricular sequences (i.e., timing in program of studies) also are needed to identify methods that address the learning needs of novice learners and experienced practitioners.

As students learn firsthand about the complex needs of children with disabilities and their families, interdisciplinary education can provide the theoretical and practical foundation for effective team assessment, intervention, and evaluation services. Identifying the most effective approaches for interdisciplinary education is an important way to improve preparation for the real world of practice.

## AUTHOR NOTES

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