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# Collaboration of Pre-Service Early Childhood Teachers in Dyads for Wikipedia Article Authoring

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### Abstract

Collaborative learning is essential in education. A prerequisite for pre-service teachers, among others, is their preparation to apply collaborative methodologies as in-service teachers. Collaborative content creation activities with Web-based wiki tools may assist in this task. In this paper, we discuss an approach involving collaboration of pre-service early childhood teachers in dyads while working on Wikipedia article authoring. To the best of our knowledge, there is no other such approach combining all these characteristics. The purpose of our approach is multifold. Main goals, among others, are to enhance students' learning through participation in collaborative assignments, to study how collaboration works in dyads, to incorporate wiki environments in their curriculum, to acquaint them with Wikipedia article authoring, to teach them to support open educational resources as volunteers and to prepare them to become members of virtual collaborative communities. From an approach such as ours, benefits can be derived for students themselves, society and Wikipedia. The number of Wikipedia authors is decreasing the last years and also the portion of female authors remains quite small.

## 1. Introduction

Collaborative learning is considered important in all levels of education. Learners gain knowledge by actively interacting with and depending on each other (Slavin 1980, 1996). They share ideas, information and work and assess each other's work as well as the work of their group. Several learning tasks such as problem solving are significantly enhanced through collaboration as new points of view come to light leading to results that could not have been achieved with individualized efforts.

To a certain degree, collaborative learning is part of the curriculum in all levels of education. Collaborative learning is inherent in early childhood education since the education of young children is based, among others, on social interaction. In-service teachers play a vital role in this aspect. More specifically, they incorporate collaborative methodologies in their instruction and initiate their students to the notion of collaboration. An obvious prerequisite is the corresponding preparation of pre-service teachers during their studies. An effective way of achieving this is the active participation of pre-service teachers in collaborative projects during their studies. Information and Communication Technologies (ICT) may be employed to support collaborative learning activities in higher education. Different types of ICT tools may be exploited for this purpose. Web-based environments providing corresponding functionalities are often used. Collaborative

content creation activities with Web-based wiki tools have been gradually incorporated into the curriculum of teacher education (Prentzas and Rekalidou 2014). There are various reasons for the increasing popularity of wiki tools in teacher education. Besides collaboration and authoring skills, they may also promote aspects such as content understanding, knowledge acquisition, critical thinking and assessment.

One of the most well-known wiki environments is Wikipedia, a very large online encyclopedia, which is among the ten most popular Web sites in the world. Its size is constantly increasing as a result of the collaboration of thousand volunteers. Pre-service and in-service teachers may play an important role as article authors and in encouraging others (e.g. students and/or student parents) to become contributors.

In this paper, we present an approach involving the collaboration of pre-service early childhood teachers in dyads while working on Wikipedia article authoring. The approach was applied in the context of an undergraduate course concerning collaborative types of learning in education and learners worked on articles with relevant subjects. The purpose of the approach is multifold. A primary goal is to enhance pre-service teachers' learning and collaboration skills by working in dyads on collaborative assignments. A second goal is to encourage them to become Wikipedia content contributors in subjects involving their field of studies. Another goal is to incorporate the specific benefits offered by wiki environments into their learning. A further goal is to teach them to endorse the notions of sharing, volunteerism and open educational resources. A final goal is their preparation to become members of virtual collaborative communities which will be useful to them as in-service teachers.

The innovation of our work concerns various aspects closely related to its multifold purpose. There are few research studies involving the collaboration of higher education students in dyads. There is not much work involving the use of pedagogical approaches to encourage higher education students to become Wikipedia article authors. Furthermore, few approaches have been presented involving integration of wiki environments in early childhood teacher education curriculum.

This paper is organized as follows. Section 2 briefly outlines relevant background knowledge. Section 3 describes the research. Section 4 presents the derived results. Section 5 discusses the derived results and the conclusions.

## 2. Background Knowledge Relevant to the Approach

This section briefly provides background knowledge involving the presented approach. It discusses introductory aspects involving dyads, learning in dyads, collaboration of higher education students in dyads, integration of wiki tools in teacher education and Wikipedia.

### 2.1. Introductory Aspects: Dyad or Group

The most appropriate group size for effective collaborative

work depends on various factors such as the type of the group, the nature of the work, the time period of acquaintance among members and practical issues (Barkley, Cross, & Major, 2005). Veerman & Veldhuis-Diermanse (2001) that studied triads and dyads maintain as well that there is no ideal group size. However, groups usually consist from two to six members (Barkley, Cross, & Major, 2005).

In literature, the terms 'dyad' and 'small group' are often used as identical. However, while researchers do not make the corresponding distinction between dyads, small groups (consisting of three to six members) and large groups (consisting of at least seven members), research work has shown that group size is related to the learning outcomes and the quality of interaction developed during the learning process (Strijbos, Martens, & Jochems, 2004). Furthermore, many researchers are not willing to claim that the results of studies involving dyads are also valid for groups consisting of more than two members (Strijbos, Martens & Jochems, 2004). Finally, Bertucci *et al.* (2010) characteristically mention the long standing paradox concerning the effect of group size in effectiveness and productivity since there are researchers concluding that group performance improves in proportion to size and others concluding that it worsens (Bertucci *et al.*, 2010, p.257).

Dyads exhibit advantages as well as limitations due to the minimum number of their members. Allen *et al.* (2013), based on research data and their personal experience, consider as advantages of the dyad, the rapid development of bonds and feelings of trust between members as well as the more effective capability of negotiation between members in issues that arise. They also point out, as the main deficiency, the limited cognitive background of a group consisting of just two members that frequently deters it from reaching high performance. This last argument is enforced by the research work of Fuchs *et al.* (2000) which found that more cognitive conflict arose and performance was better in groups of four compared to dyads. The same researchers further maintain that group size affects interaction among members as well as their contribution to joint work.

### 2.2. Learning in Dyads

Learning in dyads has been extensively studied mainly in comparison to individual learning. Results of empirical studies have shown that the performance of learners is better when they work in dyads and groups of four instead of working individually (Bertucci *et al.* 2010). In certain cases, such as the case of cognitive tasks, it is maintained that dyads work more effectively compared to individuals as well as larger groups (Baines, Blatchford, & Kutnick, 2008).

Research studies involving learning in dyads have been carried out in various learning subjects such as mathematics, computer science, foreign languages, writing and problem solving. For computer science specifically, there is a significant number of studies whose results show that compared to individual work, working in dyads enhances significantly the learning achievements of learners and their

positive attitude towards learning. Additionally, learners depend less on the tutor and become more autonomous (Williams, Wiebe, Yang, Ferzli & Miller, 2002; Williams & Kessler, 2000; Williams & Kessler, 2001; Cockburn & Williams, 2002; Jehng, 1997). More recent studies showed further advantages for learners working in dyads compared to those working individually. More specifically, learners working in dyads are more positive towards the tutor and obtain benefits conveyed to individual working conditions (Molenaar, Roda, van Boxtel & Slegers, 2012; Bodemer, 2011).

### 2.3. Collaboration of Higher Education Students in a Dyad

The dyad is considered to provide more emotional support to its members compared to larger groups (Allen et al. 2013) since its members tend to trust and open to each other easier compared to members of larger groups (Taylor, De Soto, & Lieb, 1979). The bonds connecting group members as well as other social skills that are prerequisites of collaborative work are developed faster in dyads (Allen et al. 2013; Bertucci et al. 2010; Slavin, 1996). The aforementioned aspects create, at least in the beginning, outstanding conditions for collaboration. A research study involving seventh grade students has additionally shown that students working in dyads built more social self-esteem compared to students working in groups of four and to those working individually (Bertucci et al. 2010). A research study involving high school students showed that their examination in pairs (instead of customary individual examination) resulted in less stress, greater enjoyment of the overall process and development of collaboration, motives, discussion and learning (Ngotngamwong, 2014).

However, there are few publications studying the collaboration of higher education students within dyads. Furthermore, the corresponding research work focuses mainly on quality aspects of collaboration such as the equal contribution of members to a task and the quality of contribution. The more recent work examines the collaboration of students in dyads introspectively (within the dyads). The results of a research study involving dyads and small groups of students working in writing showed that students in dyads tended to prefer dyads because their active participation was enhanced. However, students that worked in small groups had more ideas and knowledge to share and therefore had more opportunities for linguistic development. Nevertheless, a very high portion of students expressed positive opinions regarding their collaboration in the writing process and only four of them expressed the opinion that they would prefer to work individually (Shehadeh, 2011) as found in previous studies (Storch, 2005). However, in the aforementioned studies, several students based the benefits and their positive attitudes mainly on opinion exchange and discussions and secondarily on writing. Finally, in the results of *Wheeler, Yeomans & Wheeler* (2008), students claimed that their writing and critical thinking skills were enhanced by exchanging opinions and ideas through collaboration in a wiki project.

### 2.4. Teacher Education, Wiki Environments and Wikipedia

Wiki environments could be exploited to support and enhance collaborative work in higher education. More specifically, several approaches that integrate wikis in teacher education have been presented (Prentzas and Rekalidou 2014). Results are generally positive. However, there are issues that need to be dealt with in order to successfully integrate wikis in the curriculum. Such issues may be a low level of communication among learners, unwillingness to participate in the process, unwillingness to participate evenly in the process throughout the designated time period, unwillingness to alter content created by peers, unwillingness of certain learners to accept that the content they provided may be altered by their peers, unwillingness to provide sufficient feedback to peers about their work, unwillingness to accept feedback from peers, necessity of face-to-face communication among learners as well as among learners and tutors and necessity of classroom sessions. The aforementioned aspects need to be taken into consideration when designing a wiki project. Few approaches have been presented involving integration of wiki environments in early childhood teacher education curriculum.

Project is a teaching method which enhances collaboration between students in order to design a task based on a specific purpose of their choice. Frey (1998) describes the following steps for project: a) students identify the purpose, b) they plan their actions c) implementation d) they evaluate both the processes and the results. In our case students implemented the above steps which focused on authoring a Wikipedia article.

Wikipedia is a wiki environment providing free access to a large number of articles covering many subjects in over 280 languages. It is a useful information source to readers with different types of needs. Various applications (e.g. Google search engine and mobile phone applications) retrieve Wikipedia items in response to user queries (Simonite, 2013). Its articles exhibit specific characteristics (i.e. formal content, specific structure and formatting, requirement to cite relevant sources). The role of collaborating volunteers providing reliable content is obviously important.

There are two main issues concerning Wikipedia authors that need to be dealt with and are briefly discussed in the following. One issue involves the continuous decrease in the number of active authors since 2007 (Simonite, 2013; Halfaker et al. 2013). For instance, the number of active authors of the English version of Wikipedia is reported to have decreased by roughly 40% (Simonite, 2013). There is a need to attract new authors and retain them. There are many persons (e.g. article readers) that could provide content enriching the pool of active volunteers. Tools have been developed to attract new volunteers for instance by creating positive experiences to newcomers (Morgan et al. 2013; Wei, Chen & Zhu 2015; Halfaker, Keyes & Taraborelli 2013; Ciampaglia & Taraborelli 2015). Besides tools, methodologies applied in the context of courses could also assist. Another issue concerning Wikipedia authors is the gender contribution gap. Female

contributors are underrepresented since more than 80% of contributors are male (Hill and Shaw 2013; Collier and Bear 2012). This may be reflected on the subjects covered by available articles and their content. Higher education institutes could assist in handling both issues. Higher education students could be encouraged to collaborate with one another and contribute content relevant to their field of studies. The role of pre-service and in-service teachers is useful as well.

### 3. Description of the Research

#### 3.1. The Research Purpose

This research work generally aims to study the opinions of students (i.e. pre-service early childhood teachers) about their collaboration in dyads and the selection of, the contribution and the role of their partner during the project. It also aims to examine the opinions of students on whether the project itself enhanced/motivated their collaboration or not and in which phases of the project they consider that substantial collaboration between dyad members was developed.

More specifically, the following aspects are considered:

1. The criteria according to which the students of the sample chose their partner in the dyad.
2. Their initial expectations and reservations regarding their partner as well as their project.
3. Their assessment, after completion of the project, of the collaboration with their partner in the dyad and her contribution to the joint work (project).
4. The opinions of students on whether the project itself motivated/strengthened students in collaborating.
5. The phases of the project that, according to their opinion, collaboration between dyad members was substantial.
6. If a wiki environment may help collaborative skills to be emerged and enhanced.

#### 3.2. Sample

Basically all registered students of the compulsory course “Collaborative Types of Learning in Early Childhood” were eligible to participate voluntarily to the study. Finally a total of 32 female students (organized in 16 dyads) participated. At this point, it should be mentioned that more than 95% of the students in this academic Department are females. Students were in the sixth semester of their undergraduate studies while four years of studies are required for graduation.

#### 3.3. Procedures

The study was carried out during the academic year 2013-14. At the beginning of the semester students were explained the purpose and the procedures and informed that their assignment would contribute to their final grade. Those students who stated that wish to participate formed dyads. Students were encouraged to choose their partner by themselves since the free choice of partners may contribute to making them feel more comfortable and more motivated to work jointly (Barkley, Cross & Major, 2005). After their organization in dyads, students attended theoretical seminars

and lab sessions giving emphasis to dyad collaboration and techniques of exploiting wiki environments. Models and techniques of collaboration in dyads were studied. Corresponding positive aspects and difficulties were pointed out. Wikipedia articles relevant to the course were thoroughly studied. The requirements that need to be satisfied by a Wikipedia article in terms of content and structure were also discussed.

Each dyad of students had subsequently to choose an article subject within the scope of the above course and to carry out its own project, within a predetermined time period, according to the following actions (Fig. 1.):

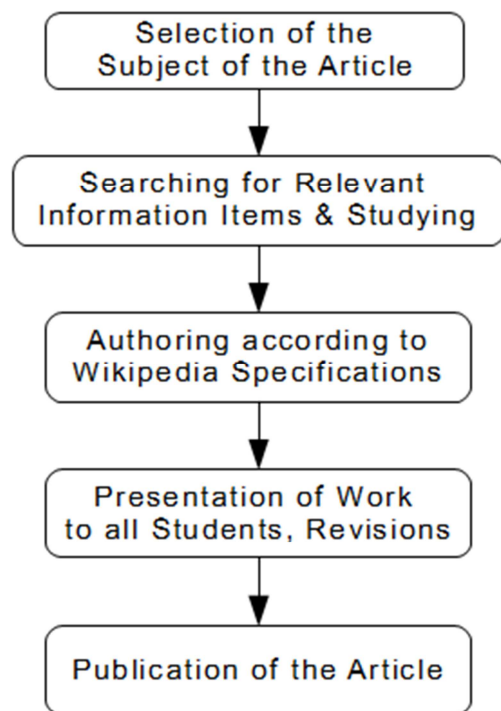


Fig 1. Project actions for each dyad.

*Action 1:* Selection of an article subject. After their selection, the members of each dyad were asked to explain, in the presence of all dyad members, their goal as well as the necessity that would be covered by achieving their goal. For instance, their goal could be to author an article with a subject that did not exist in any language in Wikipedia or to author an article in Greek by translating its version that was available in another language or to enrich/complete an available article in Greek.

*Action 2:* Searching for information items relevant to the subject of the article in credible sources and studying them.

*Action 3:* Authoring according to Wikipedia specifications.

*Action 4:* Comments are made by fellow students for improving the dyad’s work.

*Action 5:* Publication of the Wikipedia article.

Each dyad was responsible for the course and completion of its own project until the end of the semester with the guidance of the three authors whose scientific fields are teacher education, collaborative types of teaching and learning and computer science, respectively. Classroom sessions were

organized with the obligatory participation of all dyad members. In these sessions, the role of the tutors was advisory, enhancing and supervisory.

### 3.4. Data Collection

The means of data collection that were used are discussed in the following.

- a) Protocol given to students before they began to work on their assignments and more specifically after the dyads chose an article subject. Students were asked to individually reply to questions regarding the choice of their partner, their positive expectations and their reservations about collaboration with their partner. The questions contained in the protocol are given in the section discussing results.
- b) Scale A, handed out after completion of the project and involving the assessment by each dyad member of her peer as partner in the dyad. The scale of Boud (Boud 1995) was used. The assessment that each student could provide was 'Obstacle to collaboration', 'No assistance', 'Did slightly less than her share' and 'Normally did her share' according to the following criteria:
  1. Contribution of the partner to the joint assignment
  2. Quality of her contribution
  3. Readiness to contribute to the assignment
  4. Effective contribution to the assignment

In addition, students were asked to reply to the following open-ended questions:

- (i.) What were the difficulties that you faced in your collaboration with your partner while working on the assignment?
  - (ii.) What were the 'strong' points of your collaboration with your partner while working on the assignment?
- c) Scale B, handed out to students to record their personal views/estimates about their collaboration itself while doing the assignment. Their assessment could be non substantial, slightly, fairly and very substantial. Based on the Actions of the project mentioned in a previous section and in order not to fragment the students' assessment but to examine how collaboration worked during the project, we outlined four phases that students could express their opinion about their collaboration:

PHASE 1: Collaboration with the partner during the selection of the article subject and justification of the necessity to work on it.

PHASE 2: Collaboration in exchanging knowledge and opinions during as well as after studying sources relevant to the article.

PHASE 3 Collaboration during authoring.

PHASE 4 Collaboration during preparation for presentation of the dyad's work to all students.

Students were also asked to express their opinion about the following two aspects:

- a) Whether working in dyads in a Wikipedia authoring assignment is suitable for developing collaboration skills in teacher education or not,
- b) Whether this type of assignment enhanced their

collaboration or not.

Finally, students were asked to reply to an open-ended question and point out the most interesting and most deficient aspects in such an assignment.

## 4. Results

### 4.1. Replies to Questions of the Protocol

Question 1. Why did you choose the specific partner to work with on the assignment?

In the specific question, 26 of the 32 students (i.e. 81% of students) stated that they chose their partner mainly because they had collaborated in the past and had positive impressions and secondarily because they had friendly relations. Four students (i.e. 13% of students) replied that they chose to collaborate because they are friends but had not collaborated till then. Two students (i.e. 6% of students) stated that they formed a dyad because one of them wanted to do the assignment but had some difficulties with Greek since her native language was Turkish whereas the other was willing to help her in order to improve her fluency in Turkish as a foreign language. Anyway, both of them stated that they collaborate very harmonically throughout their studies as undergraduate students. From the aforementioned replies, it seems that in order to choose their partner, students were primarily based on previous positive collaboration experiences and secondarily on their friendly relations.

Question 2. Did you have difficulties in agreeing on the selection of the subject of the article? What kind of difficulties did you have (in case you had such difficulties)?

31 of the 32 students stated that they jointly chose the subject after searching and exchanging opinions. Only one student stated that the subject was chosen mainly due to her contribution. While no problems are mentioned in students' replies, it seems that they negotiated: "In my opinion, (authoring) a new article was a very demanding task... I was not certain that we could fulfill this task... I was thinking that what we would publish would be read by many people... but I liked the subject and finally agreed with the proposal of my partner" (Stud. 23). Furthermore, in students' replies regarding subject selection, difficulties involving the procedure were generally mentioned but not involving their collaboration itself: "we couldn't decide... we wanted to work on the article's references but this required more time to study different subjects and more effort to search for relevant information items in international bibliography" (Stud. 14).

Question 3: What are your expectations from your partner regarding her contribution to the fulfillment of the assignment and generally regarding your collaboration?

As far as their expectations were concerned, students mentioned the benefits that would be obtained by fulfilling the assignment and these benefits would be for both of them. Only one student mentioned her individual benefits from the overall process which according to her opinion would be gaining experiences and acquiring knowledge. In the case of the two partners whose native language differed, each student

primarily mentioned her partner’s benefits: “I believe that among the positive aspects of our collaboration will be that Aise’s fluency in Greek will improve [...] and the exchange of opinions of two persons from different cultures [...]” (Stud. 20 ). “A positive aspect of our collaboration will be the improvement of Eleni’s fluency in my native language [...]” (Stud. 25).

Students mentioned their expectations about the exchange of ideas and thoughts, learning the ‘other’ person’s way of thinking, the interdependence, helping each other, how they would collaborate, and the synthesis of different points of view: “[...] in a certain issue, our points of view may not be the same but through collaboration we will be able to discuss and take joint decisions or find joint solutions” (Stud. 24). In only one case, the reply mentions as a positive aspect the familiarization with techniques of exchanging opinions and reaching a compromise in order to carry on the collaboration.

Question 4: What are your reservations about your partner regarding her contribution to fulfilling the assignment and the collaboration that you will have and what difficulties do you think there will be?

As far as negative aspects or difficulties were concerned, seven of the students (22%) were certain that there will be no

negative aspect whereas the dyad of students with different native languages pointed out this aspect as their main difficulty. Ten of the other students (about 31%) expressed reservations about issues concerning the coordination of their individual time schedules in order to make time for collaboration. Twelve other students (about 38%) expressed reservations mainly about the assignment itself and not about collaboration mentioning issues such as searching for and retrieving relevant bibliography, the composition of retrieved information or the structure of their article. Three other students (9%) referred to issues regarding collaboration within the dyad itself and their references were connected to the delegation of roles, responsibilities and tasks “[...] the only difficult thing will be to share what each one of us will have to do” (Stud. 30).

**4.2. Scale A**

Table 1 presents the opinions expressed by students about the contribution of their partner during the collaborative assignment they fulfilled. The specific opinions were expressed after completion of the project.

*Table 1. Contribution of Partner to Fulfilling the Collaborative Assignment.*

	Normally did her share	Did slightly less than her share	No assistance	Obstacle to collaboration
Contribution of the partner to the joint work	80.6 %	13.4%	3%	3%
Quality of her contribution	77.4%	19.6%	-	3%
Readiness to contribute to the assignment	84.3%	9.7%	3%	3%
Effective contribution to the assignment	83.9%	13.1%	-	3%

A very large proportion of students expressed the opinion that during the project their partner had a normal contribution to their collaboration, had readiness to contribute to the assignment and her contribution was effective. Only in the criterion of the quality of contribution, the percentage in the category ‘normally did her share’ was slightly less compared to the other criteria and consequently the percentage in the category ‘did slightly less than her share’ was larger compared to the other criteria. Only one student expressed a negative assessment for her partner. After providing their assessment/opinion about her partner, each student replied to the open-ended questions mentioned in the following.

-What were the difficulties that you faced while collaborating with your partner for the fulfillment of the assignment?

23 of the 32 students (72%) stated that there were no difficulties in their collaboration whereas four students (13%) mentioned as a difficulty in their collaboration the coordination of their individual time schedules. Two students stated that their partner had language difficulties and two others mentioned as difficulty their different ways of reading comprehension which caused delays in their work. However, in both cases it is mentioned by the corresponding students that during the course of the project, the dyad dealt with the specific problems and carried on without other obstacles.

Finally, one student mentioned as a negative aspect in the collaboration that her partner “was not willing to collaborate” (Stud. 29).

-What were the ‘strong’ points in your collaboration with your partner?

The replies to this open-ended question were grouped into the following categories:

- a) Preexisting relations and common experiences. An important number of students (81%) replied that the preexisting experience in collaboration and the friendly relations they had were the strong point in their collaboration. They justified their replies by stating that this helped them in knowing the individual weaknesses, the needs and the endurance of their partner and consequently to show understanding, to have positive intentions and to facilitate their readiness to complement, correct and assess each other: “I have a friendly relation with my partner... and for this reason we knew the endurance, demands and needs of each other. It was easier to exchange opinions to listen to each other, to correct each other without stress and to assess each other” (Stud. 9). Furthermore, according to replies, due to previous collaborations and friendly relations there was very good communication, intimacy and pleasant atmosphere during collaboration “We made good

company since the first year of our studies, each one knows to which difficulty she must be prepared for the other and there was a very pleasant atmosphere while we worked on our assignment” (Stud. 2). Some of them even stated that after fulfilling the assignment their relation improved.

b) Exchange of opinions. Student replies that belonged to this category stressed out as a strong point the respect to the opinion of the ‘other’ while exchanging opinions and knowledge. The percentage of replies corresponding to this category was 10%.

c) Common goal. Student replies mentioning the common interest in the specific assignment fell within this category: “Both of us liked this type of assignment...” (Stud. 8). The percentage of replies corresponding to this category was 9%.

#### 4.3. Scale B

Table 2 depicts the opinions of students about their collaboration with their partner during the different phases of the project.

*Table 2. Opinions of students about collaboration with partner during different phases of the project.*

	Very	Fairly	Slightly	Non substantial
PHASE 1: Was your collaboration with your partner during the selection of the subject and the justification of the need to work on it substantial?	28 84%	3 13%	1 3%	0
PHASE 2: Was your collaboration while exchanging knowledge and opinions during and after studying article sources substantial?	25 78%	7 22%		0
PHASE 3: Was your collaboration while authoring substantial?	18 56%	7 22%	5 16%	2 6%
PHASE 4: Was your collaboration while preparing the presentation of your work to all students substantial?	29 91%	3 9%		0
Was your collaboration enhanced with such an assignment?	26 81%	6 19%		0
Working in dyads in a Wikipedia environment is suitable for developing collaboration skills in teacher education	26 81%	6 19%		0

According to the results shown in Table 2, it seems that students assessed that they had a ‘very’ substantial collaboration during the selection of the assignment subject and the justification of the need to work on it (Phase 1) as well as while preparing the presentation of their work to all students (Phase 4). The publication of their work and its presentation impelled dyad members to collaborate more. In the third phase involving article authoring, the percentage of students stating a very substantial collaboration was the lowest. However, 22% and 16% of students replied that the collaboration was fairly substantial and slightly substantial, respectively. Furthermore two students (6%) replied that their collaboration was non substantial, a reply not given in any other phase. During the second phase, 78% and 22% of students replied that their collaboration while exchanging opinions prior to authoring was very substantial and fairly substantial, respectively.

Students gave very positive replies to the two last questions shown in Table 2. These questions concern the degree to which the assignment enhanced collaboration between dyad members and whether they assess that such types of assignments are suitable for developing collaboration skills in teacher education or not. It should be mentioned that the percentages are the same for corresponding replies to both questions.

Students were also asked to point out by replying to an open-ended question the most interesting and weakest aspects in the assignment. Their replies are analyzed in the following.

##### 4.3.1. The Most Interesting Aspects of the Assignment

Several students mentioned more than one interesting aspects. In total, 55 replies were recorded as interesting aspects and according to their content were grouped into the following five categories:

- Processes, possibilities and practices of collaboration. Replies mentioning processes in the context of collaboration between dyad members fell within this category. 49% of the replies corresponded to this category. Students in these replies mentioned processes and specific practices regarded as interesting. Students mentioned that during their collaboration with their partners, they had the opportunity to communicate and interact with each other, to assess and correct each other: “The most significant aspect for me was that each student could help the other. This doesn’t happen in other types of assignments [...]” (Stud. 32), “The most interesting aspect in this assignment was that there were sessions with our tutors but we had the responsibility of assessing our work. Therefore, we assessed each other to get the desired result.” (Stud. 14), “There was continuous communication with each other... there were disagreements but collaboration prevailed [...] after all this was the goal of such an assignment: to face difficulties and get the desired outcome [...]” (Stud. 2).
- Publication of the work on the Web. 20% of the replies



included the publication of the work on the Web. In these replies, students mentioned that this made them feel proud, responsible and important since they considered that their work would be read by several readers which would acquire information from it. “[...] a very interesting aspect for me was that our work would be read by other persons beside our tutors...[...]” (Stud. 17), “[...] I feel proud because our work will be available on the Web [...]” (Stud. 16), “a very interesting aspect is that the assignment contributes to the development of our responsibility since our work will be published [...]” (Stud. 11).

- c) To take the initiative and assume responsibilities. 15% of the replies were classified into this group. These replies mentioned as an interesting aspect the fact that tutors took into consideration the opinions of students. Therefore, students felt that they took the initiative and assumed responsibilities and not just following tutor instructions as traditionally happens in assignments.
- d) The dyad. 11% of replies were classified into this group. They referred to the dyad itself and the common goals. “A very interesting aspect was that I had a common goal with my partner as well as each action we did together. We had a common vision, we searched together for information items and then exchanged opinions [...]” (Stud. 8). “We searched together for the same items, we tried together to identify our mistakes and we read aloud to each other the text we prepared to realize how it was for others to read our work” (Stud. 5).
- e) Innovation. 5% of the replies involved the innovation of the assignment without mentioning further details.

#### 4.3.2. The Weakest Aspects of the Assignment

27% of the students stated that they had no deficiency to point out in any phase of the project. Deficiencies mentioned by the other students are diverse and are grouped into the following six categories:

- a) Guidance and responsibility. 29% of students mentioned that additional guidelines should have been provided by tutors so that they would assume fewer responsibilities. “[...] tutors should have provided additional guidelines because the fact that we had the responsibility of our assignment was very stressful for us...[...]” (Stud. 12), “[...] as students we are a bit inexperienced...tutors should have had the most decisive role in our assignment...[...]” (Stud. 31).
- b) Lack of responsibility from students. 13% mentioned that certain students did not show sufficient responsibility during classroom sessions with tutors.
- c) Difficulties in finding available sources. Three students (9%) stated as a deficient aspect the difficulty in finding available sources.
- d) The duration of the assignment. Two students replied that the duration of the assignment was long and the number of sessions carried out was large.
- e) Workload of the assignment. Two students mentioned the

required workload of the assignment.

- f) Lack of collaboration. Two students mentioned that collaboration which was a prerequisite for the project was not always feasible.

## 5. Discussion and Conclusions

Interesting conclusions for discussion are derived from the results of the research. They involve the collaboration of students in dyads as well as the assessment of the assignment, that is, the implementation of a wiki-based project.

As far as the criteria of selecting a partner are concerned, it seems that free choice led to formation of dyads based on positive experiences from previous collaborations and secondarily on friendship. The former seems expected whereas the latter is not surprising since free choice usually leads to formation of groups by taking into account the friendly relations (Barkley, Cross & Major, 2005). It is thus possible that if students had not collaborated in the past, friendship would have become the primary criterion for the formation of dyads.

According to Slavin (1980), a primary aspect that needs to be taken into account in collaborations is to ensure *individual* and *group accountability* as much as possible. If these aspects are deficient or lacking, issues of free-riding or social loafing may arise e.g. one member may assume the workload of another member. In our case, the peer assessment process as well as the small size of groups (i.e. dyads) that results to rapid development of bonds and social skills between members, satisfies to a certain degree the requirements of the aforementioned two criteria.

The previous positive experiences of collaboration among students seem to have affected significantly the results. It is normal for them to constitute a factor of positive prediction for or at least to create a positive predisposition for the fruitful and equal negotiation between dyad members that was recorded for instance during the selection of the subject. For the same reasons, the positive expectations of students regarding their collaboration before the implementation of the project (e.g. exchange of ideas or mutual help) and their certainty that no negative issue will arise during their collaboration are also explained.

A positive collaboration atmosphere was also recorded during the implementation of the project as pointed out in the replies of students given for scale A and the accompanying open-ended questions as well as scale B from which a ‘very substantial’ collaboration in all of the four phases is ensued. The percentages in the second open-ended question accompanying scale A enhance the expressed opinion for the role of preexisting positive collaboration experiences among them since they distinguish it as the strongest point in their collaboration.

On the other hand, there are views maintaining that a previous good relation of dyad members may also lead to lack of objectivity in their peer assessment regarding the share of the workload attributed to each member. Allen *et al.* (2013) maintain that due to their friendship, dyad members may often



consider that their partner did an equal share of the required tasks although in reality this may not be true. For the aforementioned reservations, they also refer to a relevant research work involving dyads of higher education students which showed that 86.6% of students considered that an equal share of workload was assumed by themselves and their partners in a joint assignment (Alkaslassy, 2011). This percentage is very close to our findings from scale A regarding the estimated contribution of their partners to the joint work in three of the four criteria (see column 'Normally did her share' in Table 1).

As far as the project and working in dyads in a wiki assignment are concerned, students regard them as suitable for developing collaboration skills in teacher education. Furthermore, the difficulties in collaboration while fulfilling the assignment are not related to the wiki environment or the project itself but to personal issues such as arranging their time schedules to make time and the language.

Finally, it seems that among the most interesting aspects in this type of assignment were the collaboration processes, the initiatives they took, the responsibilities they assumed and the publication of their work on the Web. These aspects are directly connected to the alternative pedagogical approach in which they participated to fulfill their assignment. On the other hand, certain students mentioned the responsibilities they assumed while doing the assignment as a deficiency. They preferred the provision of more guidelines from their tutors and assumption of fewer responsibilities during the overall process and in the final output. Perhaps for these students, the functions of the dyad were limited to empowering only the course and the output of their work. The substantial transcendence from their part concerning the dyadic assumption of responsibilities and autonomy seemed to be a rather difficult accomplishment. The traditional views supporting teacher-directed instruction and the 'transferring' of knowledge from the tutor as its sole owner seems in certain cases to still be instilled into students and responsible for this is the educational system. Although the difficulties and challenges that students had to face while doing the assignment are acknowledged, enhancing dyad autonomy in similar projects is one of our future research directions.

Another future direction will be the creation of groups of collaborating pre-service and in-service teachers for Wikipedia article authoring. Similarly, undergraduate and postgraduate students could also work together for the same purpose in order to strengthen their cognitive and social skills as well. Wikipedia may be also used for the development of critical thinking of students, if they study recommended articles and then get involved in a critical analysis process, individually or in groups, guided by their professors.

Another application of wikis in education could be in collaboration between professors from different disciplines and students. For example, professors could assign interdisciplinary tasks to students (e.g. to work on a topic from a sociological, educational or linguistic scope). Furthermore wikis may even work as an interdisciplinary collaboration tool not only between colleagues of the same university

Department but also between colleagues from different academic Departments.

Future studies may see all those aspects of Wikipedia and examine the way that wiki environment may promote collaboration and learning in different contexts as the above. Parameters like group size, previous relations between the members of the team and accountability (individual and group) should be taken into consideration by the researchers as they may affect the outcome both quantitatively and qualitatively. Another future direction is to apply our methodology to other wiki environments besides Wikipedia.

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