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What Really Counts? – Factors Related to Effectiveness of Students' Team in Social Projects

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Aleksandra Spik*

The aim of the study was to explore the factors that determine students' team effectiveness. The study investigated the relations between three types of team effectiveness (performance, behavior, attitude) and five attributes of teamwork: common purpose, communication and problem resolution, role clarity and psychological safety.

In the study, quantitative research was performed among undergraduate Polish students of management who had to conduct a real non-profit project that would tackle a social issue. The questionnaire used in the study was specifically developed.

The results show that three components of team effectiveness have different patterns of predictors. The perceived quality of goal achievement (TE Performance) depends on common purpose, role clarity and communication and problem resolution whereas willingness to continue teamwork (TE Behavior) depends on role clarity and psychological safety.

The study contributes to understanding which team attributes are crucial for team effectiveness and how to assist students to become excellent team players. The study offers guidelines regarding the type of team experience that is necessary to foster commitment to team work among students. Moreover, acknowledging that effectiveness is more than goal attainment, the study shows the most beneficial attributes of teams.

In the presented study, unlike in many studies concerning students' teams, all of the participants had to conduct a real non-profit project that would tackle a social issue of their choice. All the projects had to meet rigid criteria of completion and timelines. Moreover, the sample was homogenous in terms of previous teamwork experience, level of project management knowledge, age, level of support from third parties during the project. The research provides a unique opportunity to investigate experience of a relatively large sample that shares similar teamwork experience in a clearly defined setting.

Keywords: team effectiveness, teamwork, team assessment.

Co się naprawdę liczy? – czynniki wpływające na efektywność zespołu w realizowanych przez studentów projektach społecznych

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Celem przedstawionego badania było określenie czynników, które determinują efektywność zespołu. Badano trzy komponenty efektywności funkcjonowania zespołu: realizację celu (performance), wpływ

* **Aleksandra Spik** – dr, Faculty of Management, University of Warsaw, Poland. https://orcid.org/0000-0002-3110-3446.

Correspondence address: Faculty of Management, University of Warsaw, 1/3 Szturmowa Street, 02-678 Warsaw, Poland.

na zachowania członków zespołu (behavior) oraz wpływ na postawy uczestników i satysfakcję z pracy zespołowej (attitude) oraz pięć charakterystyk zespołów: wspólny cel, komunikacja i rozwiązywanie problemów, podział zadań oraz bezpieczeństwo psychologiczne.
W badaniu zastosowano metody ilościowe. Uczestnikami badania byli polscy studenci studiów licencjackich na kierunku Zarządzanie, badanie dotyczyło jakości pracy zespołowej podczas realizacji projektów społecznych we współpracy z platformą edukacyjną „Zwolnieni z teorii". W celu przeprowadzania badania został opracowany kwestionariusz na podstawie narzędzi anglojęzycznych.
Wyniki wskazują, że trzy komponenty efektywności zespołu są związane z różnymi charakterystykami. Realizacja założonego celu okazała się najsilniej związana z zaangażowaniem, jasnym podziałem zadań oraz dojrzałą komunikacją i konstruktywnym rozwiązywaniem problemów. Natomiast na chęć kontynuacji pracy w zespole oraz udziału w kolejnych projektach zespołowych najsilniejszy wpływ miało poczucie psychologicznego bezpieczeństwa w zespole oraz jasny podział obowiązków.
Przedstawione badanie przyczynia się do lepszego zrozumienia jakie czynniki są najistotniejsze dla efektywności zespołu. Co więcej, wyniki badania oferują wskazówki jak wspierać pracę zespołową studentów, aby dobrze kształtować umiejętności i postawy niezbędne na współczesnym rynku pracy.
W przeciwieństwie do wielu badań na temat pracy zespołowej wśród studentów, analizowane w badaniu projekty z dużą wiernością odwzorowują realia biznesowe. Wszyscy uczestnicy musieli sami opracować pomysł, znaleźć partnerów, zaprosić beneficjentów, zdobyć fundusze i zrealizować projekt. Co więcej, badana próba (N = 106) była jednorodna pod względem wieku, poziomu wiedzy i doświadczenia w pracy projektowej oraz warunków realizacji projektu. Dlatego, uzyskane wyniki są szczególnie wartościowe tak dla badaczy, jak i dla praktyków, ponieważ łączą element trudno osiągalne w badaniach zespołów: dużą i jednorodną próbę, realia biznesowe oraz kontrolowane warunki realizacji projektów.

Słowa kluczowe: efektywność zespołu, praca zespołowa, ocena pracy zespołowe.

JEL: A20, J24

1. Introduction

There is a growing need for employees with strong interpersonal skills and ability to work in teams (Hansen, 2006; Burbach, Matkin, Gambrell, & Harding, 2010). The pace of changes on the labor market demands flexibility and learning skills embedded in team environment. Thus, graduates who are good team players are the most sought after by employers.

A study of employers conducted by Research Associates for The Association of American Colleges and Universities (AACU) revealed that 67% of employers expect colleges to put more emphasis on teamwork skills and the ability to collaborate with others in diverse group settings (Calhoun, 2014). Similar research on labor market expectations was conducted in Poland. The teamwork skills were found among the five most favored, together with "effective communication", "foreign languages skills", "openness to learning", and "commitment" (Budnikowski, Dąbrowski, Gąsior, & Macioł, 2012). In a study on different employment skills (Hodge & Lear, 2011), international students ranked group work as the most important among 15 identified skills, while US students put it in the third place, after management and interpersonal skills. Kavanagh and Drennan (2008) investigated

students' and employers' perception of group work and other skills necessary at work. The results revealed that students identified employers' expectations in regard to communication, analytical, professional and teamwork skills. However, this expectation is not recognized, both students and employers claimed that university programs did not sufficiently encourage teamwork skills. The need for tertiary educators to use a variety of teaching strategies and methods to foster teaming is becoming increasingly important.

Since teamwork is inevitable, it is vitally important to identify what constitutes a good, successful team and how to foster teamwork. This question has been frequently posed by business practitioners since team building trainings are among the most popular. However, when the issue is approached from the scientific perspective, the view gets more complex. First of all, it has to be defined what team effectiveness exactly means and how it is recognized.

In this research, we are trying to shed light on the issue of team effectiveness and teamwork in connection with a wide array of team attributes that may affect effectiveness.

Academics have introduced a number of suggestions to boost the effectiveness of teams including team-based learning, teaching teamwork skills, conducting team-building courses (Hansen, 2006; Šerić & Praničević, 2018). While these interventions are of high importance, there is still a need for better understanding the mechanisms that explain the effectiveness of successful teams (Adams & Ruiz Ulloa, 2004; Hu, Horng, & Sun, 2009; Guchait, Puiwa, & Tews, 2016).

This study aims to answer this call by examining the factors underlying perceived team effectiveness of students' teams.

There are two frequent limitations of previous research. First of all, the generalizability of results is often in question due to a limited sample. Team researchers tend to focus on case studies (e.g. Tarricone & Luca, 2002) because it is impossible to intercompare different teams. There are huge differences between teams in organizational settings regarding factors that are not controlled by the researcher but may strongly affect effectiveness. The level of previous team experience, knowledge and skills, different reward systems and organizational culture, differences in organizational, educational and technical support received by the team from the organization are among these variables that often make the generalizability of results impossible. Therefore, some researchers seek the solution in choosing homogenous groups and organizational settings. It is often achieved by focusing on student teamwork (e.g. Calhoun, 2014; Rudawska, 2017; Šerić & Praničević, 2018). In this case, team members are of similar age and team experience, have a similar level of knowledge and skills and the same organizational context. There is, however, a general limitation of such studies, namely low fidelity. Team projects carried out to complete college

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or university assignments rarely resemble "real life " projects, since there are neither clients nor budgeting involved.

The presented research offers a possibility to fill this gap and to avoid the aforementioned limitations. The purpose of the study is to investigate a large number of homogenous teams of students upon completion of real projects. The presented study aimed to explore the complex factors that explain perceived effectiveness of teams. The study set out to answer the following general questions: What are the factors that determine the perceived effectiveness of a team? How can we predict the members' satisfaction and attitudes toward teamwork? Which team characteristics are the most beneficial for the perceived effectiveness?

2. Literature Review

There is a large body of research regarding teamwork and the effectiveness of teams. Teamwork is defined by Scarnati (2001, p. 5) "as a cooperative process that allows ordinary people to achieve extraordinary results". However, in practice, teams frequently fail to "achieve extraordinary results", which urges scholars and practitioners to investigates the secrets of successful teams.

2.1. Team Effectiveness

Past research has often focused on team performance as a team outcome. Recent scholars have suggested the need to assess additional effectiveness criteria such as team satisfaction, team commitment, willingness to continue work in the team (Wageman et al., 2005; Mohammed et al., 2010; Guchait et al., 2016). Adams, Vena and Ruis Ulloa (2002) advanced a proposition that is in line with these claims (Figure 1).

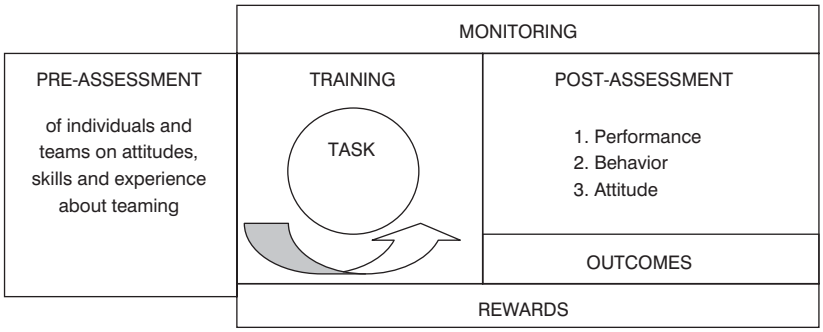

Fig. 1. Team effectiveness model. Source: Adams et al., 2002.

The aforementioned model is designed as a universal tool to assess team performance. The proposition comprises three stages (Adams, Vena, & Ruiz Ulloa, 2002). At first, it is advised to conduct pre-assessment. During this time, future team members are diagnosed for their attitudes toward teamwork, knowledge, skills and level of experience concerning teaming. This phase is necessary to establish a baseline for growth measurements, since individuals differ in their initial level of teamwork knowledge and experience. Next, training in subjects such as: communication, role clarification, conflict resolution, decision-making techniques, goal setting, and proper evaluation techniques is recommended. Consequently, teams go through the task performance process with the on-going monitoring by coaches and instructors. Finally, once the task is completed, post-assessment is conducted to measure the effectiveness of the team.

Although many scholars and practitioners acknowledge that performance of the team should be defined as the extent of goal completion, regarding quantity, quality and timelines, few have noted that there are also other qualities that should be taken into account (Šerić & Praničević, 2018). Experience of particular teamwork influences attitudes and shapes future behaviors of team members. Work in a team may be perceived as beneficial for individuals as regards skill development and gaining valuable experience. Therefore, it may foster or inhibit future willingness to contribute in teams.

Thus, some scholars call for including team satisfaction, attitudes toward teamwork and willingness to continue work in a team in effectiveness measurement (Mohammed et al., 2010; Guchait et al., 2016).

The model advanced by Adams et al. (2002) is in line with these claims. In the model, three levels of effective outcomes are defined, labeled as: **performance**, **behavior** and **attitude**. Performance concerns the extent to which the outputs meet the standards of quantity, quality and timeliness of those who use the product or receive the service. Behavior refers to the extent to which the team experience contributes to the willingness to continue working in the team and engage in other teamwork. The third level, attitude, is focused on examining how the process of carrying out the work enhances the satisfaction with teamwork and positive emotions.

In a similar vein, Wageman, Hackman and Lachman (2005) broaden the definition of team effectiveness by proposing a three-dimensional model (p. 376):

1. The productive **output** of the team that meets or exceeds the standards of the team's clients.
2. The **social processes** the team uses in carrying out the work that enhance members' capability to work together interdependently in the future. Effective are only these teams that are more capable as performing units when a piece of work is finished than they were when it was begun.

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3. The **experience** that contributes positively to the learning and well-being of individual team members rather than frustrating, alienating, or deskilling them.

According to Nancarrow, Boot, Ariss, Smith, Enderby, and Roots (2013), there are specific benefits that comprise the effectiveness of students' teams such as: improvement of students' management and communications skills, development of a clear vision of the group culture, understanding of different group roles, and increased flexibility on the individual and group level.

2.2. Determinants of Effectiveness

In this section, we are trying to answer the following question: which attributes of teams are the most consequential for team effectiveness?

The literature offers a number of concepts of a successful team's characteristics. In general, all propositions comprise long lists of conditions to be met by teams with certain overlaps between these models. However, the question still remains: which of these positive team attributes makes a real difference in terms effectiveness?

Wageman at al. (2005) address the aforementioned question by identifying five general conditions that increase the likelihood (but do not guarantee) that a team will perform well:

1. *Real team*. Real teams are recognized when team members bear collective responsibility for the outcome. Moreover, these teams have stability of memberships that allows individuals to learn how to cooperate together well.
2. *Compelling direction*. A good team direction is challenging, clear and engages a wide range of skills and talents of team members.
3. *Enabling structure*. The team should be of an appropriate size and well-composed with a well-designed group task. Thereby, the team should be as small as possible to accomplish a given task and comprise individuals with complementary talents and skills.
4. *Supportive organizational context*. This condition breaks down to three aspects. First, the reward system must provide positive consequences for excellent team performance. Therefore, the appraisal and reward system should be team-focused rather than individual-focused. Second, educational and technical assistance should be provided. Finally, the information system should provide the team with all the data needed.
5. *Available expert coaching*. Help can be offered to maximize the outcomes of team efforts and reduce problems and conflicts. Similarly, the coach shares his or her expertise to improve team skills and foster innovating ways of proceeding with work.

While Wageman et al. (2005) focus on the organizational surrounding (i.e. appropriate coaching, reward system and challenging goal) as crucial for effectiveness, Tarricone and Luca (2002) put more emphasis on internal

team characteristics. In this model, factors that are essential for a successful team are:

1. *Commitment to team success and shared goals* – team members are motivated to achieve a common goal and committed to obtain the highest level of performance;
2. *Interdependence* – successful teams encourage their members to express and utilize their specific skills and talents. The team's environment facilitates the synergy effect, in other words, cooperation leads to far more superior outcomes than the work of individuals;
3. *Interpersonal skills* – effective teamwork demands high levels of emotional intelligence, strong work ethic, flexibility and negotiations due to constant collaboration often under tight deadlines;
4. *Open communication and positive feedback* – team members should be willing to discuss issues openly as well as to give constructive feedback on fellow members' contribution;
5. *Appropriate team composition* – each team should have clear and just work division. Members should understand their duties well;
6. *Commitment to team processes, leadership and accountability* – delivering work on time and punctuality are among behaviors that demonstrate the accountability of team members. Such behaviors bring stability to the teamwork and are essential in coordinating group work.

Adams et al. (2002) continue this stem of reflection putting even more stress on processes that occur within the team. On the basis of literature review and practice, Adams at al. (2002) identified 7 factors that are characteristic of successful teams:

1. *Common purpose*. The main objective of the team is shared and understood by all team members;
2. *Clearly defined goals*. Team goals are clearly understood by all team members;
3. *Psychological safety*. It is a shared belief that the team is a safe place to express different opinions and take interpersonal risk;
4. *Role clarity*. Every team member understands well what is expected from him or her. There is a clear work division in the team and the duties of fellow members are clearly stated;
5. *Mature communication*. Communication that allows every team member to articulate clearly his o her ideas, be listened to without interrupting and receive constructive feedback;
6. *Productive conflict resolution*. Procedures and actions taken when a conflict occurs that lead to positive results, openness to discussion of different opinions;
7. *Interdependence*. Mutual dependence and trust that fellow members will meet their duties.

It is worth noticing that Adams et al. (2002) have identified a very interesting determinant of effective teams – *psychological safety* that has not

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been found by other research teams. Moreover, the model offers a complete view of different aspects of team effectiveness (performance, behavior and attitude) and is designed to develop and facilitate teaming in the educational context. Due to these advantages, the model was chosen to serve as a theoretical basis for the presented study.

2.3. Relationships Between Attributes of Students' Teams and Team Effectiveness – Empirical Evidence

There have not been many studies regarding students' team effectiveness. Moreover, the existing studies differ in terms of definitions of constructs. Some researchers assume that attitude toward teamwork is one of the components of perceived team effectiveness (Adams et al., 2002; Wageman et al., 2005), others define effectiveness only as the quality of delivered product (Luca & Tarricone, 2002; Rudawska, 2017). Still, others avoid these controversies replacing the term "effectiveness" by "benefits of teamwork" (Šerić & Praničević, 2018). The aforementioned discrepancies in the body of research hinder intercomparisons of studies.

The research results mentioned below are limited to those that regard students' teamwork and analyze the relation between team effectiveness and the attributes of successful teams. Moreover, it is indicated which definition of effectiveness was adopted in every study.

The study of Ruiz Ulloa and Adams (2004) revealed that perceived effectiveness of teamwork measured as a positive attitude toward teamwork was stronger if determinants such as mature communication, interdependence, psychological safety, common purpose, role clarity and goals were present during working in group sessions. It is important to note that in that study only one of three effectiveness component was assessed.

In the earlier study, Adams et al. (2002) found that three aspects of perceived team effectiveness (performance, behavior and attitude) could be predicted by four team characteristics: common purpose, psychological safety, conflict resolution and interdependence. Whilst all four characteristics had a positive and statistically significant relation with effectiveness, common purpose proved to have the strongest impact on all three aspects of effectiveness. Rudawska (2018) found that effectiveness defined as performance (perception of the achievement of an assumed aim) could be predicted by the level of good preparation of teamwork (definition of the aim, division of roles, accountability) and the presence of a team leader.

Other research revealed factors that are detrimental to perceived effectiveness of teams. Peslak (2005) found a surprising dynamics of emotions of students who participated in a long-term on-line project. It was observed that, although team emotions at the beginning of the project were more positive than negative, negative emotions dominated over time and led to lower team satisfaction (effectiveness as attitude).

Goold, Augar and Farmer (2006) revealed that 15% of students did not like online group work because of communication difficulties. Moreover, the research found that frustration increased when other students were not involved as expected. Accordingly, some students believed that they had done more work than other team members.

Recent findings obtained by Šerić and Praničević, (2018) regarding a large sample of international students' team revealed that participants did not prefer group work over individual work that much and that they did not feel more motivated working in groups than working alone. Moreover, that lack of motivation of some members is one of major problems of a successful group's work. The findings suggesting students' reluctance and disappointment upon involvement in teams prove that greater focus should be on assisting instructors with deeper knowledge on teams functioning.

On the basis of the studies described above, the following hypothesis has been put forward:

H1. There is a significant difference between students who consider their team as highly effective (in regard to performance, behavior and attitude) and students who find their team ineffective in their team experience referring to:

- H1a – common purpose
- H1b – communication and conflict resolution
- H1c – role clarity
- H1d – psychological safety

On the basis of the findings of Adams et al. (2002) and Ruiz Ulloa and Adams (2004). the following hypothesis have been put forward:

H2 Team effectiveness regarding performance (TE Performance) depends on common purpose, communication and conflict resolution, role clarity and psychological safety.

H3 Team effectiveness regarding behavior (TE Behavior) depends on common purpose, communication and conflict resolution, role clarity and psychological safety.

H4. Team effectiveness regarding attitude (TE Attitude) depends on common purpose, communication and conflict resolution, role clarity and psychological safety.

3. Research Methods

3.1. Measures

Although there are several available diagnostic tools regarding team functioning, they did not comply with the purpose of the study. First of all, commercially available tools referring to team effectiveness and performance were inapplicable to scientific purposes due to the lack of validity and

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reliability measures. Whilst there are validated tools for teaming available in Polish, they do not refer to the subject of the study, since they concern different aspects of teams such as team roles (Witkowski & Ilski, 2000).

Based on these limitations, a new questionnaire was developed. Several tools assessing team effectiveness were examined (Lewis, 2004; Bushe & Coetzer, 2007; Wageman et al., 2005; Adams & Ruiz Ulloa, 2004).

The team effectiveness model of Adams and Ruiz Ulloa (2004) was chosen as the theoretical basis for the questionnaire. In the first phase, items from different questionnaires were gathered (Lewis, 2004; Bushe & Coetzer, 2007; Wageman et al., 2005; Adams & Ruiz Ulloa, 2004). Next, items that refer to the teamwork aspects that did not fit the setting of the investigated team's experience were dropped. For example items:"*Different people are constantly joining and leaving this team" (R), "This team is quite stable, with few changes in membership"* (Team Diagnostic Survey, Wageman et al., 2005) were eliminated because respondents were not allowed to change teams during the projects.

Items were translated and cultural adaptation was performed. The selected items matched the seven factors of effective teams advanced by Adams and Ruiz Ulloa (2004). Regarding the face validity, two independent experts in related fields were asked to provide feedback. In order to select items that fitted the cultural and organizational context of the Polish sample, translated items were presented to students during introductory management classes. Students were asked to assess items with regard to two criteria:

1. The question is relevant to my teamwork experience;
2. The meaning of the item is clear and easy to understand.

Items that at least 20% of the students found irrelevant and/or unclear were eliminated. If both criteria where met, the item was included in the final questionnaire.

In the next step, Principal Axis Factoring (PAF) with varimax rotation was conducted to determine the dimensionality of the questionnaire. A four-factor solution was obtained (eigenvalues greater than 1) with variance explained of 67.3%.

The item was included in the suitable scale if the meaning of the item was theoretically consistent with the construct definition represented by the factor. Moreover, the item's factor loading had to be greater than 0.500. The factors did not reflect the theoretical structure of the Team Effectiveness Model (Adams & Ruiz Ulloa, 2004) but the obtained results were in line with the findings of Adams and Ruiz Ulloa, who also did not confirm the 7-factor structure due to high intercorrelations. The summary of results of PAF is presented in Table 1.

Scales	Items	Factor loading EFA	FACTOR
Role clarity and work division	1. I understood what my job entailed within the team.	0.782	IV
	2. I understood well the roles of other team members.	0.541	IV
	3. I clearly understood the team purpose.	0.537	IV
	4. There was a proper work division in our team	0.793	I*
	5. It was clear to me what my duties were in the team.	0.858	IV
Psychological safety	6. I could trust the other team members to do their part of the job.	0.807	I
	7. I could always count on other team members when I needed help.	0.631	I
	8. People in this team sometimes rejected others for being different (R).	0.559	II*
	9. No one in this team would deliberately act in a way that undermines my efforts.	0.945	V
	10. It was difficult to ask for help other team members (R).	0.747	I
Mature communication	11. I could effectively communicate my ideas in the team	0.704	II
	12. Our team meetings were productive	0.664	I
	13. I felt comfortable asking for clarifications in the team if something was not clear	0.631	II
	14. Members of the team were able to bring up problems and tough issues.	0.514	II*
Problem solving	15. We usually managed to resolve conflicts in a constructive way.	0.568	I
	16. Disagreements were accepted and encouraged in our team.	0.764	II
	17. It was easy to express different opinions in our team.	0.667	II
Purpose commitment and motivation, interdependence (common purpose)	18. The team members were enthusiastic about accomplishing the team's goals.	0.879	I
	19. All of the team members participated in taking decisions in our team.	0.642	I
	20. The team was committed to meeting team goals.	0.757	I
	21. We motivated each other when things were difficult.	0.632	I

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Scales	Items	Factor loading EFA	FACTOR
Team effectiveness Performance (TE Performance), Team effectiveness behavior (TE Behavior), Team effectiveness attitude (TE Attitude)	22. I developed my skills and competences working in this team.	0.624	III
	23. This team's performance exceeds our expectations.	0.616	III
	24. My experiences in the team will contribute to my career success.	0.794	III
	25. I am satisfied with the quality of my team experience.	0.598	III
	26. I would like to continue working with this team in the future.	0.772	I
	27. I find this teamwork valuable and I would like to have more projects like this during studies.	0.672	III

*Item excluded from further analysis.

Tab. 1. Factor loadings of items and preselection of items (summary). Source: Own elaboration.

Reliabilities for the scales by Cronbach's alpha estimates were high and are presented in Table 2. Items with factor loadings of less than 0.500 were not included in the final questionnaire.

Scales	Number of items	Cronbach's α
Psychological safety	4	0.846
Common purpose	4	0.911
Communication and problem solving	6	0.889
Role clarity	4	0.853
Team effectiveness	6	0.863

Tab. 2. Reliabilities of the scales. Source: Own elaboration.

Common method bias test. In the presented study, the data was acquired by a self-descriptive method. In such cases, it is advisable to conduct Harman's single-factor analysis (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) to assess the extent to which the common method variance may affect the results. In the course of exploratory factor analysis with unrotated solution, it was found that the maximum variance that is explained by a single factor was 42.65%. It may be concluded that the data set used in the research does not suffer from common method bias because the result of Herman's single factor analysis is less than 50%.

3.2. Participants and Setting

The participants were undergraduate students enrolled in the Introduction to Management II at the Management Department at a large university in Poland. The team size ranged from 4 to 7. All of the participants were at the first year of bachelor studies. The teams were intact for 16 weeks throughout the semester. All of the students had to conduct a real non-profit project that would tackle a social issue of their choice y means of educational tools available on the Social Wolves platform. The Social Wolves platform (zwolnienizteori.pl) is an online guide prepared in cooperation with the Project Management Institute, Coca-cola and Google that offers tutorials and tests in project management, marketing and digital skills. Every project registered on the platform is assisted by a mentor who checks on the project progress and accepts documents sent by the project team to complete every stage of the project development. Participants have to finish the project within the timeframe and meet the requirements regarding successful completion (e.g. number of beneficiaries).

The projects were complex and involved the usage of a wide array of project management tools that were taught and trained during the course Introduction to Management I. First of all, participants had to divide themselves into teams, organize brainstorming session to create ideas and agree upon the common goal of the project. Finding a common vision that would be appealing to every team member was frequently reported as the most challenging issue.

Next, every team had to create a work breakdown structure of all the tasks, find sponsors and partners, conclude cooperation agreements, invite beneficiaries, organize marketing and communication of the project. Moreover, the students had to seek and organize funding for their projects. The aim was to have students experience all the issues that are faced with in real life projects in the real environment and gain hands-on experience. However, the initiatives varied in terms of themes and extent to which they had to met rigid criteria for project completion such as to perform within a limited time frame (16 weeks) and to gain the minimum number of beneficiaries (90). The projects tackled a wide array of issues: discrimination and stereotypes (Game Over Boarders), healthy life style (Bycie Fit jest Git, UW Championships), pets adoption (Podaj Łapę) and many others.

The questionnaire was sent via email to 273 students after the completion of the final team project. The participation in research was voluntary and was not rewarded with extra credits. 106 students completed the questionnaire (N = 106).

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4. Research Results

4.1. Findings Concerning Hypotheses 1a-1d

In order to test **hypothesis 1**, to determine whether the differences in team effectiveness are related to characteristics (psychological safety, common purpose, communication and conflict, role clarity), a t-student test was conducted. The respondents were divided into three groups with high and low perceived team effectiveness. To that end, the data clustering with k-means clustering method was used. Three clusters with a high, medium and low level of perceived effectiveness were identified. Groups with high and low perceived effectiveness were subjected to further analysis. Next, the independent sample t-student test was conducted. The findings are presented in Table 3.

Team characteristic	Perceived effectiveness	Number of cases	Mean	Std. deviation	Std. error mean
Communication and problem resolution	High Low	50 20	26.74 18.30	3.45 4.77	0.49 1.06
Common purpose	High Low	50 20	15.96 8.8	3.74 2.67	0.53 0.60
Psychological safety	High Low	50 20	11.46 6.40	3.05 1.87	0.43 0.42
Role clarity	High Low	50 20	17.80 11.20	2.08 3.46	0.29 0.77

Tab. 3. Mean values of team characteristics for groups with high and low perceived team effectiveness. Source: Own elaboration.

The analyses revealed that the group with high perceived team effectiveness differed statistically significantly from the group with low perceived effectiveness with respect to all measured team characteristics: common purpose, communication and problem resolution, psychological safety and role clarity.

For example, students with high perceived team effectiveness described their teams with a statistically significantly higher level of common purpose ($M = 15.96$, $SD = 3.74$) than students with low perceived team effectiveness ($M = 8.8$, $SD = 2.66$). The t test value was 8.98 with $p < 0.001$ with equal variances not assumed ($F = 4.94$, $p = 0.03$).

It is worth noticing that the differences remained statistically significant at $p < 0.05$ even when the cases were divided just into two groups not into three groups (the cut point for two groups of perceived effectiveness was the median). Thus, hypotheses 1a, 1b, 1c, 1d were confirmed.

4.2. Findings Concerning Hypotheses 2–4

In order to investigate hypotheses 2–4, the multiple linear regression was conducted independently for different components of perceived effectiveness (TE Performance, TE Behavior, TE Attitude).

As regards **hypothesis 2**, team effectiveness operationalized as performance (TE Performance) was examined. This component of team effectiveness reflects the quantity, quality and timelines of the outcome as well as the mastery of skills.

The results are presented in Table 4.

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	St. error			
(Constant)	–1.519	0.822		–1.848	.048
Role clarity	0.270	0.055	0.420	4.881	.000
Communication and conflict resolution	0.086	0.042	0.181	2.021	.046
Common purpose	0.145	0.052	0.270	2.796	.006

Tab. 4. Results of multiple linear regression for TE Performance. Source: own elaboration.

The model is statistically significant and explains 56% of variance (adjusted R squared) at $p < 0.001$.

TE Performance = –1.519 +0.420*Role clarity + 0.181* Communication & conflict resolution + 0.270 * Common purpose

Role clarity is the strongest predictor of TE Performance. The relation between these variables is positive, in other words, the stronger the role clarity, the more intensive the TE Performance. Common purpose and communication & conflict resolution are also predictors of TE Performance, positively correlated with this variable. The findings suggest that the impact of psychological safety is statistically insignificant, thus, it was removed from the model. Hence hypothesis 2 was partially confirmed, TE Performance depends on common purpose, role clarity, communication and problem resolution.

To test **hypothesis 3**, the multiple regression analysis concerning TE Behavior was performed. The results are presented in Table 5.

The model explains 67% of variance (assessed with Adjusted R Square) and is statistically significant at $p< 0.001$.

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Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	St. error	Beta		
(Constant)	–.541	.630		–.858	.008
Communication and problem resolution	.124	.034	.270	3.625	.001
Psychological safety	.423	.051	.620	8.317	.001

Tab. 5. Results of multiple linear regression for TE Behavior. Source: own elaboration.

The regression equation is as follows:
TE Behavior = –0.541 + 0.62 * Psychological safety + 0.27* Role clarity

TE Behavior can be predicted with two team characteristics included in the analysis: psychological safety and communication and problem resolution. The strongest predictor is psychological safety, the relation is positive and equal to 0.62. The findings suggest that the second predictor of TE Behavior is role clarity. The relation is also positive, hence the stronger the role clarity of the team perceived by the respondent, the higher the demonstrated level of TE Behavior. Other team characteristics examined in the analysis were statistically insignificant. Therefore, hypothesis 3 has been partially confirmed, TE Behavior depends on psychological safety and role clarity.

In order to examine **hypothesis 4**, the multiple regression analysis concerning TE Attitude was performed. The results are presented in Table 6.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	St. error	Beta		
(Constant)	–1.267	.789		.269	.028
Communication and problem resolution	.123	.036	.269	.561	.001
Role clarity	.347	.049	.561	.269	.001

Tab. 6. Results of multiple linear regression for TE Attitude. Source: own elaboration.

The obtained model is statistically significant at $p < 0.001$ and explains over 50% of variance (Adjusted R Square = 0.549). The obtained results show that TE Attitude depends on communication and problem resolution and role clarity.

TE Attitude = –1.267 + 0.561*Role clarity + 0.269*Communication and problem resolution

The findings reveal that role clarity has the strongest positive influence on TE Attitude. Communication and problem solving are the second team

attribute that positively influences TE Attitude. Other team characteristics included in the research were found statistically insignificant and were eliminated from the model. Thus, hypothesis 4 has been partially confirmed only as regards communication and problem solving and role clarity.

5. Discussion

This study set out to answer the question of the factors consequential for team effectiveness perceived by students working in teams while conducting social projects. To address this issue, a questionnaire was developed and several factors assumed to be related to effectiveness were measured. Moreover, three components of effectiveness were assessed.

With a focus on real projects that involve all the stages of project management, we found that three components of team effectiveness depend on team characteristics described as: common purpose, communication and problem resolution, role clarity and psychological safety.

Moreover, our findings expose different patterns of determinants for each component of effectiveness. Effectiveness understood as the quality of results and mastery of skills has been found to depend on role clarity, communication and problem resolution and common purpose. The strongest relation was obtained with role clarity. In other words, good work division and well understanding of one's role in a team as well as understanding of the duties of other members are the most beneficial team attributes when performance is concerned.

On the other hand, willingness to involve in other teamwork as well as willingness to continue work in the team turned out to be highly dependent on psychological safety. The findings are very interesting, considering that psychological safety turns out to be related only to this component of team effectiveness. The obtained results reveal that the crucial factor for students to maintain commitment to teamwork is the team climate of mutual trust and respect, in which it is comfortable for people to be themselves.

The findings both confirm and extend the existing research. The obtained results were partially in line with the findings of Adams and Ruiz Ulloa (2004), who evidenced the role of mature communication, psychological safety, problem resolution, role clarity and common purpose. The presented study showed, however, that three components of effectiveness are affected by different factors. Thus, the presented results should encourage other researchers to investigate the factors conditioning teams effectiveness of students teams as well as adopt the model for organizational settings. Better understanding of factors underlying team effectiveness would enable tutors, teacher and managers to tailor training and interventions aimed at boosting a particular component of perceived team effectiveness.

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5.1. Limitations

The specifics of the presented research limited the diversity and quantity of respondents to the students who conducted a social project in cooperation with the Social Wolves platform. The researchers had a unique opportunity to investigate experience of a relatively large sample that shares similar teamwork experience in a clearly defined setting. Moreover, the sample was homogenous in terms of previous teamwork experience, level of project management, knowledge, age, level of support from third parties during the project. Therefore, the experience of participants could be intercomparable. However, the limited sample size might reduce the reliability of factor analysis. The sample size required for a stable factor analysis is usually given as a function of the number of items being tested (generally 10 cases for every item). In regard to the presented study, a larger number of respondents would be required to ascertain a stable factor analysis of the questionnaire. Therefore, further research is needed to confirm the results of the study on a larger and more diversified sample.

6. Conclusions

The research contributes to explaining team characteristics related to team effectiveness. What is more, the research offers an in-depth insight into team effectiveness not reduced only to goal attainment. While the achievement of the team's goal is the most obvious outcome of teamwork, the approach presented in the study puts emphasis also on other consequences of teamwork such as willingness to continue teamwork and satisfaction with this experience. From a practical standpoint, these attitudinal and behavioral outcomes of teamwork should be noticed by practitioners since they might be of high importance in the long-term perspective.

References

Adams, S.G., Vena, L.C.S., & Ruiz Ulloa, B.C. (2002). A pilot study of the performance of student teams in engineering education. In *Proceedings of the American Society for Engineering Education Annual Conference & Exposition.* Session 2330.

Budnikowski, A., Dąbrowski, D., Gąsior, U., & Macioł, S. (2012). Pracodawcy o poszukiwanych kompetencjach i kwalifikacjach absolwentów uczelni – wyniki badania. *E-mentor*, *4*(46), 4–17.

Bushe, G.R., & Coetzer, G.H. (2007). Group development and team effectiveness: Using cognitive representations to measure group development and predict task performance and group viability. *The Journal of Applied Behavioral Science*, *43*, 184–212.

Calhoun, D.C. (2014). *Teaching teamwork to college students through cooperative learning: Faculty attitudes and instructional best practices* (Dissertation). University of Maryland.

Fisher, S.G., Hunter, T.A., & Macrosson, W.D.K. (1997). Team or group? Managers' perceptions of the differences. *Journal of Managerial Psychology*, *12*(4), 232–242.

Goold, A., Augar, N., & Farmer, J. (2006). Learning in virtual teams: Exploring the student experience. *Journal of Information Technology Education*, *5*, 477–490.

Guchait, P., Lei, P., & Tews, M.J. (2016). Making teamwork work: Team knowledge for team effectiveness. *The Journal of Psychology*, *1540*(3), 300–317. https://doi.org/10.1080/0022380.2015.102456.

Hansen, R.S. (2006). Benefits and problems with student teams: Suggestions for improving team projects. *Journal of Education for Business*, *82*(1), 11–19.

Hodge, K.A., & Lear, J.L. (2011). Employment skills for 21st century workplace: The gap between faculty and student perceptions. *Journal of Career and Technical Education*, *26*(2), 26–41.

Hu, M.M., Horng, J., & Sun Y. (2007). Hospitality teams: Knowledge sharing and service innovation performance. *Tourism Management*, *30*, 41–50.

Kavanagh, M.H., & Drennan, L. (2008). What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations. *Accounting and Finance*, *48*(2), 279–300.

Kunkel, J.G., & Shafer, W.E. (1997). Effects of student team learning in undergraduate auditing courses. *Journal of Education for Business*, *72*(4), 197–200.

Lewis, K. (2004). Knowledge and performance in knowledge-worker teams. A longitudinal study of transactive memory systems. *Management Science*, *50*, 1519–1533.

Mohammed, S., Ferzandi, L., & Hamilton, K. (2010). Metaphor no more: A 15-year review of the team mental model construct. *Journal of Management*, *36*, 876–910.

Nancarrow, S.A., Booth, A., Ariss, S., Smith, T., Enderby, P., & Roots, A. (2013). Ten principles of good interdisciplinary team work. *Human Resources for Health*, 11–19.

Peslak, A.R. (2005). Emotions and team projects and processes. *Team Performance Management*, *11*(7/8), 251–262.

Rudawska, A. (2017). Students' team project experiences and their attitudes towards teamwork. *Journal of Management and Business Administration*. *Central Europe*, *25*(1), 78–97. https://doi.org/10.7206/jmba.ce.2450-7814.190.

Ruiz Ulloa, B.C., & Adams, S.G. (2004). Attitude toward teamwork and effective teaming. *Team Performance Management: An International Journal*, *10*(7/8), 145–151. https://doi.org/10.1108/13527590410569869.

Scarnati, J.T. (2001). On becoming a team player. *Team Performance Management: An International Journal*, *7*(1/2), 5–10.

Šerić, M., Praničević, D.G.(2018). Managing group work in the classroom: an international study on perceived benefits and risks based on students, cultural background and gender. *Journal of Contemporary Management Issues*, *23*(1), 139–156. https://doi.org/10.30924/mjcmi/2018.23.1.139.

Tarricone, P., & Luca, J. (2002). Successful teamwork: A case-study. In *HERDSA Conference proceedings* (pp. 640–647).

Wageman, R.J., Hackman, R., & Lehman, E. (2005). Team diagnostic survey: Development of an instrument. *Journal of Applied Behavioral Science*, *41*, 373–384. https://doi.org/10.1177/0021886305281984.

Witkowski, S., & Ilski, S. (2000). Walidacja kwestionariusza ról zespołowych: A self–perception inventory R. M. Belbina. *Przegląd Psychologiczny*, *43*(1), 47–64.

 https://doi.org/10.7172/1644-9584.86.9