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A Mediation Model of the Usability and Intergroup Relation for Online Project Management Community Effectiveness with Microsoft Teams

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Abstract: Effective international project team development and management is a crucial aspect of project management that directly influences the performance and satisfaction of team members. As reductions in travel and physical mobility are prioritized for sustainability efforts, especially after the COVID-19 pandemic, it is of paramount importance to identify and share effective innovative remote, online project management practices. The purpose of this study is to address the scarcity of related research and investigate the impact of Microsoft (MS) Teams usability on team management effectiveness as mediated by intergroup relation. The population of this study includes university personnel that have participated in the Erasmus+ project Benefit, with a sample size of 52 respondents. The data was analyzed using SmartPLS 4.0. The findings revealed that the usability of MS Teams had a direct, positive, and substantial influence on intergroup interactions and team performance. Further intergroup relations have a direct and significant impact on team effectiveness. The findings of the mediation study indicated that the association between MS Teams usability and team effectiveness is partially mediated by intergroup interactions.

Keywords: usability; Microsoft teams; project management; team effectiveness; SEM-PLS

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1. Introduction

Projects are of increasing importance for the economy in the 21st century. Public institutions and businesses prefer to organize a growing number of their activities and personnel around flexible projects [1]. In the context of the European Union, international projects funded through competitive programs such as Erasmus+ (plus) constitute a consistent strategic choice to promote multilateral cooperation across borders towards common objectives with positive economic and societal impact [2].

Projects are temporary actions with concrete goals and unique deliverables that have a clear beginning and end [3]. Project management includes a series of processes organized into five coherent groups: initiation, planning, implementation, monitoring, and closure [4]. Moreover, the successful management of projects addresses several activity areas and processes related to team development, scope achievement, time management and scheduling, cost control, internal and external communications, risk management and quality assurance. Human resources and their relationships through multimodal communication lie at the heart of projects.

However, projects are complex endeavors that face several risks and challenges throughout their duration as diverse obstacles can derail their smooth execution. In fact, there is reported evidence that most projects fail: over half of projects exceed their planned resources or time or fail to deliver the sought outcomes [1,5]. Common problems of

projects include poor or ineffective communication (e.g., unanswered emails), lack of skills, resources, and limited personnel availability due to excessive workload [5]. Projects with multiple intercultural and international teams feature an additional layer of complexity as it results in coordination issues of everyday work [6]. In the context of Europe, there are several project funding frameworks for different purposes such as Horizon Europe for research, LIFE for environmental protection, and Erasmus+ for education and training [2]. International projects that involve academic partners from different countries face additional challenges such as different academic calendars, structures, and work cultures [7].

Projects often involve members with complementary skills and geographically distributed teams in multiple locations called remote or virtual teams [8]. The distance between virtual team members increases complexity in terms of coordination, visibility, communication and cooperation towards the common objective [9]. Virtual teams require multiple technological tools and platforms to address practical aspects of their work related to management, work scheduling and tracking, scope and cost progress monitoring, procurement, quality assurance and control, and written and oral communications within the team, with other internal and external stakeholders, and collaborators [10]. These needs can be facilitated by virtual office suites with interoperable online applications on the web such as Microsoft 365 and Google Apps/Workplace [11]. Suggested tool categories include instant messaging, online meetings, file sharing, and joint calendars [12]. A recent systematic literature review established the importance of emotions and relationships as well as work-life balance and digital well-being as keys for optimal team performance [13]. It verified that one of the most important challenges of virtual teams that can undermine the team's cohesion and achievement is the building of trust that emerges both from formal and informal interpersonal interactions, demonstrating to team members that they value each other and their collective mission [14,15]. Previous research has shown that collaborative activities and meetings in immersive learning environments enable virtual team members to become an online community forged by cordial professional relationships that mitigate physical isolation [16,17].

The recent COVID-19 pandemic introduced an additional burden for project teams as it disallowed travel and regular physical team meetings [18]. As a result, all project teams were instantly transformed into virtual teams [19]. At the same time, the effects of the climate crisis rendered a turn towards sustainable project management with fewer greenhouse gases emissions [20]. Hence, it is of paramount importance to identify and share effective remote project management practices. Specifically, this work responds to the call to identify and understand innovative project management practices with the support of information communication technologies [18]. The goal of this study is to address the scarcity of related research and evaluate the effectiveness of online community software for project management effectiveness. It presents evidence from the capacity-building Erasmus+ BENEFIT project, which featured 10 academic working groups residing in Europe and in the Middle East.

Online community evaluation in the context of project management focuses on three dimensions: usability, team effectiveness, and intergroup relation. The usability of an information system is a critical and well-established measure of its capability to execute with effectiveness its primary functions towards an educational goal [21]. If a software platform has high usability, it can effectively support and enable teams in achieving their mission. Conversely, low usability due to technical or design factors can inhibit project teams' efforts and more importantly demotivate users from the adoption and use of a critical infrastructure.

Microsoft (MS) Teams belongs to the tools that have been widely deployed for remote emergency teaching and the facilitation of the needs of online working groups and communities during the pandemic [22,23]. One of its comparative advantages is that it is incorporated seamlessly within the online MS authentication service and software apps ecosystem. Moreover, in the context of online learning and online, remote project manage-

ment, MS Teams combine one important feature: it can facilitate three essential modes of communication and collaboration [24]:

- Synchronous online meetings through audio and video conferencing;
- Asynchronous, flexible written communication through both public threaded posts and private messaging;
- Shared storage along with collaborative creation and editing of team files.

Additionally, through elaborate user access option modifications, Teams can facilitate the operation of multiple groups, sub-units and divisions in separate, and dedicated spaces (called channels), open or private, within the same online virtual environment (MS Teams). However, the richness of functions does not guarantee its usability for every use case and should be investigated.

Successful project teams have harmonic relationships, communicate openly, can resolve tensions and disagreements and achieve productive results through trust and cooperation [25,26]. In the context of multi-partner, international projects, several autonomous groups co-exist and operate independently. Often members from all partner teams form and participate in committees that are involved with the governance and the performance of essential project tasks that are relevant to most partners such as dissemination, monitoring, and quality assurance [27].

Effective project team development and management is a crucial aspect of project management that directly influences the performance and satisfaction of team members. Project teams undergo different stages: forming, storming, norming, and performing [28]. Upon their creation, in the storming phase teams face challenges related to work culture, priorities, habits, communication style, decision making, and conflict resolution that need to be discussed and resolved [29,30]. This can ensure the prevalence of positive emotions that are instrumental for high performance. The management of successful virtual teams is closely associated with a shared vision and strong feelings of belonging in a virtual community [31,32]. In this direction, principles of effective virtual team management include establishing virtual presence and collaboration and positive team relationships [33,34]. These issues are amplified in the context of multinational projects with multiple autonomous teams of partner institutions with members that need to cross-collaborate in different functions and working groups. In online settings, team stability, commitment, and persistent communication are essential for project success [35].

The study's conceptual framework, depicted in Figure 1, addresses a gap in the existing literature and offers a theoretical examination of the effectiveness of managing online teams, particularly in the context of the COVID-19 pandemic. This framework encompasses both direct and indirect connections between the usability of MS teams and the effectiveness of team management, employing intergroup relations as the mediating variable in the connection.

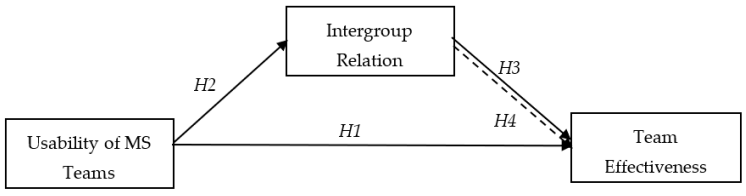

Figure 1. Conceptual Framework.

Based on the conceptual framework, seven research hypotheses were formulated for investigation, namely:

H1. *Usability of MS team has a positive and significant effect on team effectiveness.*

H2. *Usability of MS team has a positive and significant effect on intergroup relation.*

H3. *Intergroup relation has a positive and significant effect on team effectiveness.*

H4. *Intergroup relation mediates the link between usability of MS and team effectiveness.*

2. Materials and Methods

This study employs a causal descriptive technique in the quantitative research paradigm. It aims to clarify the link between variables and to test hypotheses about the effect of one or more independent variables, which include staff gender, category, university, and staff degree on dependent variables (usability of MS team, team effectiveness, and intergroup relation).

2.1. Projects and Online Used Platform

The Erasmus+ project "Boosting Innovation in Education and Research of Precision Agriculture in Palestine" (BENEFIT) began in 2020 during the COVID-19 epidemic and experienced significant physical mobility limitations for most of its duration [36]. Most of the participants in this project have participated in similar projects within Erasmus+ in the past. The BENEFIT project featured academic teams from four European nations, Bulgaria, Czech Republic, Greece, Slovakia, as well as Palestine. As they live in nations with varying workweeks and academic semester patterns, the team members from various cultural and religious backgrounds span across different time zones. A virtual online environment was foreseen for the objectives of this project [37]. Several possibilities were investigated in this situation. Finally, it was agreed to employ MS Teams to orchestrate a virtual community and enable the formal and casual online communication needs of all partner institutions interested and active participants.

2.2. Population and Sampling

The target group of this study consisted of all participants in BENEFIT project from all 10 partner institutions (Table 1). The sampling methodology used was nonprobability sampling with a saturated sample strategy, which encompassed all members of the population, resulting in a sample size of 65 people. Their professional role in the project was as follows: 27 academic staff members, 12 technologists, 9 managerial staff members, and 4 administrative employees. Table 1 depicts the study sample's distribution based on its independent variables, which include staff gender, category, university, and staff degree.

Table 1. Distribution of the respondents according to the demographic variables (N = 52).

Variables	Category	Frequency	Percentage (%)
Gender	Female	20	38.5
	Male	32	61.5
Staff Category	Management	9	17.3
	Teacher/Researcher	27	51.9
	Technical	12	23.1
	Administration	4	7.7
University/Country	ANNU/Palestine	5	9.6
	HU/Palestine	4	7.7
	PASS/Palestine	7	13.5
	PTUK/Palestine	8	15.4
	QOU/Palestine	5	9.6
	SUA/Slovakia	4	7.7

Table 1. *Cont.*

Variables	Category	Frequency	Percentage (%)
University/Country	UCAS/Palestine	4	7.7
	UPAT/Greece	5	9.6
	URAK/Bulgaria	5	9.6
	VEST/Czech Republic	5	9.6
Staff Degree	Bachelor	7	13.5
	Master	21	40.4
	PhD	24	46.2

2.3. Measurement Tools

Following a study of the literature and a survey of online resources [38,39], an item-based questionnaire was created and utilized as a tool to aid data collection and to assess the usefulness of online community software for project management. The original questionnaire's content validity was assessed using a peer review technique online using the pre-test method [40]. It was given to four faculty staff members who served as peer reviewers. The returned notes were collected, and the tool was adapted accordingly. The final version of the questionnaire (Appendix A) had 25 items spread across 3 dimensions, which corresponded to the team's findings about the utilization of the MS Teams during the COVID-19 pandemic. All items used a 5-point Likert-style scale, (1 being "Strongly Disagree" and 5 being "Strongly Agree") [38]. The MS Teams usability construct has 10 components, the intergroup relation contains 7 items, and the team effectiveness contains 7 items. In addition to the questionnaire four items are included as personal and demographic variables (Table 1). The survey started in February 2023 and after three reminders, data collection ended in March 2023. The reminders consisted of written messages to all BENEFIT project members (65) from 10 ten partners' institutions. A total of 52 out of the 65 online questionnaires were returned (80%).

2.4. Statistical Analysis

Data analysis in this study was conducted in two stages after collecting enough data to meet the minimum sample size criterion (N = 52). The first stage was carried out using the Statistical Package for Social Sciences (SPSS version 25). In SPSS the following tasks were performed: descriptive statistics (frequency distribution and mean reporting), inferential statistics (variance analysis and *t* test), a preliminary analysis for measurement reliability and validity, data normality, and the Pearson's correlation analysis. The second step was carried out using the Structural Equation Model-Partial Least Squares (SEM-PLS), using Smart-PLS software version 4.0 for the data analysis [41]. The PLS Path Model consists of two critical components: the evaluation of the measurement model (Outer Model) and the investigation of the structural model (Inner Model) [42].

3. Results

3.1. Data Analysis of the Studied Sociodemographic Profiles

Concerning the respondents' gender, most of the respondents were male (61.5%), doctoral degree holders (46.2%), and (51.9%) were teacher/researcher, followed by technical (23.1%), management (17.3%), and administration staff (7.7%). In terms of the country and the university the participants belong to, 15.4% were from PTUK, 13.5% were from PASS, and 9.6% from each of ANNU, QOU, UPAT, VEST and URAK universities. While 7.7% of the respondents were from each of UCAS, HU, and SUA universities. Most participants were from Palestine (63.5%), wile 36.5% were from European countries (Table 1). It is usual for samples from higher education to comprise more PhDs in comparison to other educational levels. Thus, it can be argued that the sample represents the wider population of partner Universities in the BENEFIT Project.

3.2. Preliminary Data Analysis

For data analysis in SmartPLS4, a method called consistent bootstrapping was used. This method follows the methodological direction suggested by Ref. [43]. The choice to employ consistent bootstrapping was based on the study objective of accurately estimating the parameters of the reflective measurement model. This procedure was recommended for its consistency and reliability in estimating parameters. Furthermore, the use of consistent bootstrapping is widely recognized as a reliable method for evaluating models in structural equation modeling, as explained in the handbook on PLS-SEM [44]. The open reporting of the consistent bootstrapping approach improves the dependability and comprehensibility of the statistical analyses carried out in this study, hence enhancing the overall methodological consistency of the research.

The significance threshold was set at 0.05. We also established a threshold of 0.708 for outer loadings to ensure indication reliability. Any indicators in the 0.40 to 0.78 range were evaluated for removal, but only if their removal resulted in improvements in composite reliability and Average Variance Extracted (AVE) over the suggested levels indicated by Ref. [42]. As indicated in Table 2, the outer loadings of the majority of reflective structures are above the crucial criterion of 0.708. However, we discovered four indications connected to MS Team Usability, one item connected to team effectiveness, and two items connected to intergroup relation with loadings below this level, forcing us to remove them to improve the AVE of the corresponding constructions.

Table 2. Outer loading model final stage.

	Intergroup Relation	MS Team Usability	Team Effectiveness
MS_U10		0.914	
MS_U4		0.65	
MS_U6		0.818	
MS_U7		0.91	
MS_U8		0.831	
MS_U9		0.453	
TE1			0.749
TE3			0.851
TE4			0.857
TE5			0.793
TE6			0.602
TE7			0.727
TIn1	0.958		
TIn2	0.749		
TIn3	0.602		
TIn4	0.729		
TIn7	0.737		

Usage of MS Teams: MS_U4—MS_U10, Intergroup relation: Tin1—Tin7, Team effectiveness: TE1—TE7.

Finally, our measurement model demonstrated good internal consistency reliability, as proven by Cronbach's alpha values of 0.901 for Usability of MS Teams, 0.877 for Intergroup Relation, and 0.894 for Team Effectiveness. Similarly, our composite reliability values demonstrated good internal consistency dependability, ranging from 0.89 (Intergroup Relation) to 0.92 (Usability of MS Team). These results collectively demonstrate the high level of internal consistency reliability for all four reflective constructs.

3.3. Convergent and Discriminant Validity Assessment

Table 3 shows the results of the convergent validity evaluation, which is based on the Average Variance Extracted (AVE) values. The AVE values for the three variables studied (MS Team usability (0.608), intergroup relation (0.583), and team effectiveness (0.590)) are all above the minimal criterion of 0.50. This suggests that the measures for the three reflective constructs have a high degree of convergent validity, implying that the

corresponding latent variables account for more than half of the variance in the relevant indicators. Furthermore, the square root of the AVE for each construct is greater than the correlation coefficients between that construct and the others in Table 3. These elevated values confirm the adequacy of the divergent validity of the constructs.

Table 3. Cronbach's alpha, Composite reliability, and Average variance extracted (AVE).

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Result
Intergroup Relation	0.877	0.890	0.583	Reliable
MS Usability	0.901	0.922	0.608	Reliable
Team Effectiveness	0.894	0.903	0.590	Reliable

The Fornell–Larcker criterion is a commonly employed technique for evaluating discriminant validity in the field of structural equation modeling. The process entails comparing the square root of the Average Variance Extracted (AVE) for each latent construct with the correlations between that latent construct and the other latent construct. In Table 4, the values in the brackets show the square root of the Average Variance Extracted (AVE) for each latent variable. The values that are displayed without the use of brackets, on the other hand, represent the correlations between the latent variables. Examining the intergroup relation, its AVE has a square root value of (0.763), which is higher than its correlations with MS team usability 0.569 and team effectiveness 0.750. This pattern remains true for the other latent constructs as well. The square root of the average for MS team usability (0.779) is higher than its associations with intergroup relation 0.569 and team effectiveness 0.741. Moreover, the square root of the average variance extracted (AVE) for team effectiveness (0.768) surpasses its associations with intergroup relation 0.750 and MS team usability 0.741.

Table 4. Fornell–Larcker criterion.

	Intergroup Relation	MS Team Usability	Team Effectiveness	
Intergroup Relation	0.764	(0.763)		
MS team Usability	0.569	0.780	(0.779)	
Team Effectiveness	0.750	0.741	0.768	(0.768)

These data suggest that the indicators of each latent variable have a stronger correlation with their corresponding latent variables than with other latent variables. Put simply, the Fornell–Larcker criterion in Table 4 confirms that our measurement model has discriminant validity. This validation strengthens the overall reliability of our study. This result highlights the efficacy of selected indicators in accurately measuring the distinct variability of each underlying construct without being excessively affected by other constructs. The credibility of our model is further supported by its strong fit indices, which enhance the reliability of our findings. The assurance of measurement validity increases our confidence in drawing accurate conclusions regarding the relationships between the variables.

Table 5 displays the loadings and cross loadings for each indication. As an illustration, the MS U10 indicator showed the greatest value for the loading of its related construct—MS Usability (0.914). The cross loadings with other constructs were observed to have lower values of 0.509 (intergroup relations, and 0.685 (team effectiveness). The same conclusion applies to the other measures of intergroup relations, and team effectiveness. Thus, the establishment of discriminant validity has been confirmed.

Table 5. Loading and cross-loading of indicators.

	Intergroup Relation	MS Team Usability	Team Effectiveness
MS_U10	0.509	0.914	0.685
MS_U4	0.458	0.650	0.414
MS_U6	0.460	0.818	0.610
MS_U7	0.458	0.910	0.719
MS_U8	0.443	0.831	0.638
MS_U9	0.337	0.453	0.275
TE1	0.442	0.671	0.749
TE3	0.661	0.609	0.851
TE4	0.723	0.558	0.857
TE5	0.507	0.673	0.793
TE6	0.459	0.440	0.602
TE7	0.640	0.447	0.727
TIn1	0.958	0.520	0.739
TIn2	0.749	0.465	0.532
TIn3	0.602	0.346	0.449
TIn4	0.729	0.376	0.578
TIn7	0.737	0.449	0.530

Usage of MS Teams: MS_U4—MS_U10; Intergroup relation: Tin1—Tin7; Team effectiveness: TE1—TE7.

3.4. Assessment of the Structural Model

The study looked at the R^2 values, which measure the proportion of explained variance in Team effectiveness and found it to be significantly high at 0.709. As a result, the model revealed a great ability to explicate the endogenous latent variables. Changes in R^2 values were obtained to estimate the effect sizes (f^2) of the predictors. Table 6 shows that the effect sizes (f^2) linked with the endogenous latent variables ranged from 0.479 to 0.550. These results indicate a moderate impact size (f^2) of the predictors [42]. Notably, the variable Intergroup relation had the most significant influence (f^2 = 0.550) on team effectiveness, whereas the impact of MS team usability on intergroup relation was (f^2 = 0.479).

Table 6. R^2 values, Q^2 predict, and the effect size (f^2).

	R-Square	R-Square Adjusted	(f^2)	Q^2 Predict
Intergroup Relation	0.324	0.310		0.367
Team Effectiveness	0.709	0.697		0.156
Intergroup Relation -> Team Effectiveness			0.550	
MS team Usability -> Intergroup Relation			0.479	
MS team Usability -> Team Effectiveness			0.500	

Table 6 also includes the results of the blindfolding method, which was used to test the accuracy of the model's predictions. The result revealed that all Q^2 values were greater than zero, validating the effective reconstruction of observed values. These findings, as shown in Table 6, highlight the model's predictive power.

3.5. Structural Model Evaluation

The structural model evaluation is linked to hypothesis testing, with the goal of determining the influence of independent variables (Exogenous) on the dependent variable (Endogenous). The Second Order technique, which involves assessing latent variables based on dimensions and indicators, was used in this study to examine the Inner Model or hypothesis testing. The consistent PLS-SEM (PLSc-SEM) algorithm was used for the evaluation on the basis of 5000 resamples in this investigation, which was made possible by the SmartPLS 4.0 program.

Testing the Direct and Indirect Effects among Variables

In the context of using structural equation modeling, it is crucial to distinguish between the mediation effect and the indirect influence. These concepts represent separate elements of how variables interact with each other. A mediation effect occurs when an independent variable influences a dependent variable by means of a mediator variable. This phenomenon can occur through both direct and indirect means [45]. Although mediation and indirect effect have different meanings, scholars often use these terms interchangeably because of their linguistic similarities and the fact that both direct and indirect effects are considered in mediation [46]. The use of interchangeable terminology is justified since the ultimate objective is to quantify the total impact of the independent variable on the dependent variable along a specified pathway. In this study both terms are used interchangeably to precisely capture the complex interaction between different components.

As shown in Figure 2, and presented in Table 7, the structural model analysis shows that the three direct paths are statistically significant at the 0.001 level. Tables 7 and 8 show the result of the direct and indirect effect respectivelly. The next sections elaborate on and explain these findings in further detail.

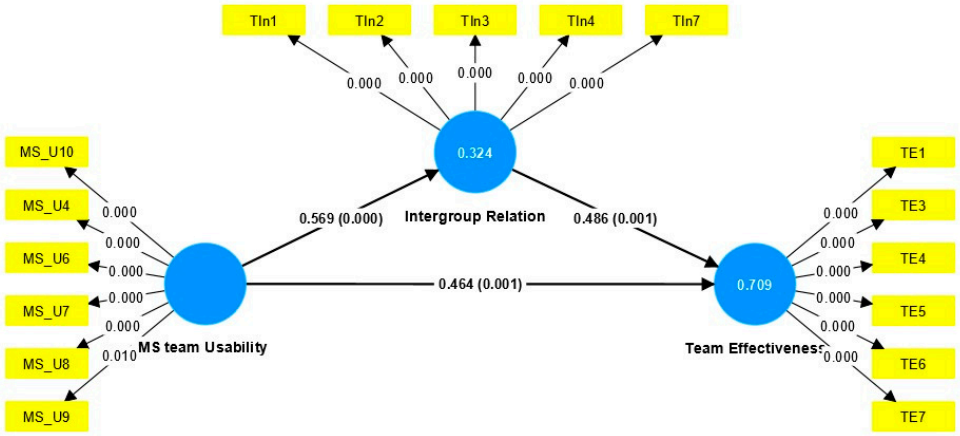

Figure 2. The inner model. Source: Smart-PLS4.0 1-9-2023.

Table 7. Results of direct relationship testing.

	Hypothesis	Path Coefficient	*p* Values	Result
H1	MS Teams Usability -> Team Effectiveness	0.464	0.000	Accepted
H2	MS Teams Usability -> Intergroup Relation	0.569	0.001	Accepted
H3	Intergroup Relation -> Team Effectiveness	0.486	0.001	Accepted

Table 8. Results of indirect effect.

		Standard Deviation	*T* Statistics	*p* Values	Result
H4	MS team Usability -> Intergroup Relation -> Team Effectiveness	0.095	2.913	0.004	Accepted

4. Discussion

4.1. The Direct Link between the Usability of MS Teams and Team Effectiveness

The results show that the path coefficient of the impact of usability of MS Teams on team effectiveness is 0.464. This means that a higher level of MS Teams usability is positively associated with a high level of team effectiveness. In addition, the findings of the hypothesis testing reveal that the *p*-value for the impact of the usability of MS Teams on team effectiveness is 0.000, which is less than the significance threshold of 0.05. This indicates that the usability of MS Teams significantly affects team effectiveness. Consequently, if there is a higher level of usability of MS Teams, it is likely that team effectiveness will significantly improve. Thus, H1 is accepted. To discuss this result, many empirical studies have examined the link between usability of technology, such as MS Teams, and its effect on team effectiveness. For example, a study on pre-service teachers' perceptions of MS Teams effectiveness, found that the usability of these tools and learning outcomes are strongly and positively correlated [47]. This indicates that when teachers use and navigate the tool easily, they tend to be more efficient, and more productive. Furthermore, Laurencia and Sudarto [48] evaluated the use of MS Teams for online learning during the COVID-19 pandemic. They concluded that when teachers and students rate MS Teams as user-friendly, they also evaluate collaboration, knowledge sharing, and learning outcomes more favorably. Likewise, a study that examined online English teaching and learning with MS Teams suggested that the link between technology usability and team effectiveness is statistically supported [49].

4.2. The Direct Link between the Usability of MS Teams and Intergroup Relation

The results show also that the path coefficient of the effect of MS Teams usability on intergroup relations is 0.569. This shows that the link among the various participant groups within the BENEFIT project will experience a positive increase when they use MS Teams extensively. Furthermore, the results of the hypothesis testing in the research designate that the *p*-value for the relationship between the usability of MS Teams and intergroup relations is 0.001, which is less than the significance threshold of 0.05. This suggests that the usability of MS Teams exercises a statistically significant influence on intergroup relations. Consequently, if there is an increase in the level of communication among the universal BENEFIT groups, it can be inferred from the research results that H2, which posits that usability of MS Teams has a positive and significant effect on intergroup relations, is accepted. This result is in line with the findings of Blanchard [15], who studied the impact of COVID-19 on virtual online group work. The study revealed that frequent use of collaboration and communication tools led to higher intergroup communication and collaboration especially in virtual teams, which in turn increased the intergroup relations. Consequently, the study suggested that increased usability of communication tools led to improved intergroup cooperation and more dynamic interdepartmental interactions.

4.3. The Direct Link between Intergroup Relation and Team Effectiveness

The results show further that the path coefficient of the link between intergroup relations and team effectiveness is 0.486. This means that the effectiveness of BENEFIT teams will practice a higher level of relations with their partners from different universities around the world. Hypothesis testing reveals that the *p*-value for the link between intergroup relations and team effectiveness is 0.001, which is less than the significance threshold of 0.05.

This means that communication among groups has a statistically significant effect on team effectiveness. Consequently, when an improvement occurs in the level of communication within the BENEFIT community, the overall effectiveness of the project team would improve remarkably. Thus, H3 is accepted. This corroborates previous empirical research. For instance, a study by Freitag and Hofstetter [50] during the pandemic, noted that serious and negative emotions associated with the threat of COVID-19 shaped similar attitudes towards immigrants. Bui et al. [51], in their meta-analysis, highlighted the importance of achieving high levels of communication and diversity in order to increase team performance. To sum up, effective intergroup relations in diverse teams can result in higher levels of team effectiveness [27].

4.4. Usability of MS Teams on Team Effectiveness through Intergroup Relation

The results of indirect effect, as shows in Table 8, reveals that the *p*-value for the relationship between MS Teams usability and team effectiveness through intergroup relations is 0.004, which is less than 0.05. This outcome means that there is a significant indirect effect of the usability of MS Teams on team effectiveness through intergroup relations. Particularly, if the usability of MS Teams within groups and communication with other partner groups is increased, the overall team effectiveness would also increase and reach optimal levels. Thus, H4 is accepted. Additionally, as shown in Table 9, the 95% confidence interval ranged from 0.134 to 0.509. This indicates a statistically significant indirect effect as the confidence interval does not include zero. This means that increasing the usability of MS Teams and fostering a high level of communication among different groups of the project would result in a positive increase in the effectiveness of teams. This result is supported by the findings of other studies. For example, a study in sustainability, by Buchal and Songsore [52], declared that employing MS Teams has led to high level of collaborative knowledge building among members. Moreover, they suggested that the usability of technological communication tools such as MS teams positively affected team performance in online teams. In addition, Hargreaves, et al. [53] found a positive link between the usage of MS Teams during the COVID-19 pandemic and the performance of NHS trust community service in North-West England. Furthermore, recent research studied the factors affecting team effectiveness in hospitals and found that the usage of electronic collaborative tools is a mediator on team effectiveness [54]. Hence, these studies emphasize the importance of usability in collaboration tools such as MS Teams and its impact on intergroup relations within a team, which, in turn, influences overall team effectiveness. As businesses increasingly rely on understanding and improving the usability of such tools, they can have a significant positive effect on team dynamics and effectiveness.

Table 9. Total indirect effect—confidence intervals.

	Original Sample (O)	Sample Mean (M)	2.50%	97.50%
MS team Usability -> Team Effectiveness	0.277	0.295	0.134	0.509

4.5. Research Implications

The link between MS Teams usability and team performance is both direct and indirect. It functions indirectly through intergroup connections, particularly by raising communication levels and giving support and counsel within the BENEFIT community. Intergroup relations have the greatest impact on team effectiveness of any of these criteria. An emphasis on communication technologies such as MS Teams is vital for improving and optimizing team performance within Erasmus+ projects. Project coordinators or other policy entities can hold training workshops to teach participants how to use such technologies successfully, especially in difficult communication conditions such as the COVID-19 pandemic. Furthermore, community building activities targeted at establishing ties among various university groups may considerably improve project teams' overall effectiveness

and efficiency. This might include giving members advice on proven and innovative project management methods that can be employed in their work.

Importantly, educating participants to nurture a desire to learn how to use platforms such as MS Teams and Zoom has the greatest influence on member and intergroup connections. As a result, it is critical to guarantee that there is a perceptible shift in the interactions among members and groups following the training sessions to improve and maximize the usage of MS Teams within project communities. Project managers should focus on enhancing the usability of technologies like MS Teams to improve and maximize the efficacy of Erasmus+ project teams. This may be accomplished by teaching and supporting team members to use these technologies meaningfully. Furthermore, soliciting feedback from members before selecting work tools can be very beneficial for their adoption and willingness to use. Moreover, in order to improve team effectiveness within the project community, the administration should guarantee that the training programs facilitate and cultivate attitude change among participants, encouraging them to engage in high-quality communication with their coworkers. For example, this might entail adapting training to consider team members' cross-cultural experiences, as well as offering resources and guidance that can meet particular requirements such as working with colleagues from distinct settings marked by acute political or cultural contrasts and conflicts.

5. Conclusions

In the context of this study, it should be emphasized that the BENEFIT project had planned to train Palestinian higher education faculty members in online learning course design and remote teaching. This professional development action was foreseen prior to the pandemic to strengthen the technological and pedagogical capabilities of concerned academic faculty members. Indeed, this procedure has been critical to the overall project's success. As a result, this study was carried out to evaluate the performance of the BENEFIT team while employing MS teams throughout the pandemic. The findings of this study revealed that the usability of MS Teams had actual and positive influence on team performance, intergroup interactions, and team member relationships. However, this study has additional limitations, most notably the small sample size of 52 participants, which is related to the modest size of the project community. As a result, future researchers can improve the study model by increasing the sample size. Such an approach would broaden the scope of research, making it a valuable resource for evaluating international projects within the larger filed of project team management. Furthermore, future research should investigate other moderating factors that were not addressed in this study. For example, characteristics such as cross-cultural communication and corporate culture, which are known as factors impacting team success, might be valuable subjects to investigate.

As a result of the study findings and discussion about the obstacles experienced by Erasmus+ project BENEFIT during the COVID-19 epidemic, numerous practical insights were formulated, which can be valuable for academic institutions and project teams facing comparable challenges. Improving MS Teams usability is related to a favorable and statistically significant influence on team effectiveness. This implies that increasing the usability of MS Teams can lead to an improvement in total team performance. Furthermore, better MS Teams usability has a favorable and statistically significant impact on Member Relations and Intergroup Relations within the project community. This suggests that improving the usability of MS Teams can improve connectivity and communication both between partner groups and among individual group members. Furthermore, greater intergroup relations are favorably and strongly related to the project's team effectiveness. This means that increasing cohesiveness in intergroup interactions might lead to increased team effectiveness. Finally, through its influence on intergroup relations, the usability of MS Teams has a positive and statistically significant effect on team effectiveness. This elucidates the causative link, implying that by strengthening intergroup ties utilizing MS Teams as a facilitation tool, team effectiveness may be improved. In essence, these findings

highlight the possibility of using MS Teams to promote stronger intergroup interactions, which in turn improves overall project team effectiveness.

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Appendix A. Study Questionnaire

5-level Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)

Usability of MS Teams

1. I think that I would like to use MS Teams frequently.
2. I found MS Teams unnecessarily complex.
3. I thought MS Teams was easy to use.
4. I think that I need the support of a technical person to be able to use MS Teams.
5. I found the various functions in MS Teams were well integrated.
6. I thought there was too much inconsistency in MS Teams.
7. I would imagine that most people would learn to use MS Teams very quickly.
8. I found MS Teams very awkward to use.
9. I felt very confident using MS Teams.
10. I needed to learn a lot of things before I could get going with MS Teams.

Intergroup Relations

1. We are able to resolve conflicts with other teams collaboratively.
2. We seek to arrange our priorities to meet the needs of other work groups.
3. We communicate effectively with other groups.
4. Our team has established trusting and supportive relationships with other teams.
5. We work toward integrating our plans with those of other work groups.
6. Our collaborations with other teams are productive, worthwhile, and yield good results.
7. The goals of our group support those of other groups.

Team Effectiveness

1. Our team has a meaningful, shared purpose.
2. We are strongly committed to a shared mission.
3. We focus on big-picture strategic issues as much as on day-to-day activities.
4. We set and meet challenging goals.
5. We consistently produce strong, measurable results.
6. We make sure our work helps the organization achieve its goals.
7. The mission and goals of my team are well aligned with the organization's mission and goals.

References

1. Nieto-Rodriguez, A. The Project Economy Has Arrived. *Harv. Bus. Rev.* **2021**, *99*. Available online: https://hbr.org/2021/11/the-project-economy-has-arrived (accessed on 2 November 2023).
2. European Commission EU Funding Programmes. Available online: https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes_en (accessed on 2 November 2023).
3. Kourounakis, N.; Maraslis, A. *PM2 Project Management Methodology: Guide 3.0*; Publications Office of the European Union: Luxembourg, Luxembourg, 2018.
4. Project Management Institute. *A Guide to the Project Management Body of Knowledge (PMBOK®Guide)*; PMI: Philadelphia, PA, USA, 2008; Volume 40, ISBN 1933890517.
5. Jenner, S. Why Do Projects 'Fail'and More to the Point What Can We Do about It? The Case for Disciplined,'Fast and Frugal'Decision-Making. *Management* **2015**, *45*, 6–19.
6. Popescu, A.-D.; Borca, C.; Fistis, G.; Draghici, A. Cultural Diversity and Differences in Cross-Cultural Project Teams. *Procedia Technol.* **2014**, *16*, 525–531. [CrossRef]
7. Sadecka, A. Virtual Team Work: Case Study of the European Commission Programme Erasmus Mundus Action 2. *Int. J. Innov. Educ.* **2014**, *2*, 207. [CrossRef]
8. Hinds, P.J.; Weisband, S.P. Knowledge Sharing and Shared Understanding in Virtual Teams. In *Virtual Teams That Work: Creating Conditions for Virtual Team Effectiveness*; Gibson, C.B., Cohen, S.G., Eds.; Jossey-Bass: San Francisco, CA, USA, 2003; pp. 21–36.
9. Casey, V.; Richardson, I. Project Management within Virtual Software Teams. In Proceedings of the 2006 IEEE International Conference on Global Software Engineering (ICGSE'06), Florianopolis, Brazil, 16–19 October 2006; pp. 33–42.
10. Kneisel, E. Knowledge Sharing and Creation in Virtual Teams—An Integrated Framework. In *Imagination, Creativity, and Responsible Management in the Fourth Industrial Revolution*; IGI Global: Hershey, PA, USA, 2019.
11. Patković, S.; Mujkić, T.; Valjevac, T.; Kubat, A.; Muhić, S. Virtual Office—Practical Implementation of Models to Improve the Experience in Virtual and Digital Work Environment. In *Advanced Technologies, Systems, and Applications VII*; Ademović, N., Mujčić, E., Mulić, M., Kevrić, J., Akšamija, Z., Eds.; Springer International Publishing: Cham, Switzerland, 2023; pp. 737–750.
12. Ale Ebrahim, N.; Ahmed, S.; Taha, Z. Virtual Teams: A Literature Review. *Aust. J. Basic Appl. Sci.* **2009**, *3*, 2653–2669.
13. Chamakiotis, P.; Panteli, N.; Davison, R.M. Reimagining E-Leadership for Reconfigured Virtual Teams Due to COVID-19. *Int. J. Inf. Manag.* **2021**, *60*, 102381. [CrossRef]
14. Resta, P.; Shonfeld, M. Challenges and Strategies in Designing Trans-National Learning Team Projects in Virtual Worlds. In Proceedings of the Society for Information Technology & Teacher Education International Conference 2014, Jacksonville, FL, USA, 17–21 March 2014; Searson, M., Ochoa, M.N., Eds.; Association for the Advancement of Computing in Education (AACE): Waynesville, NC, USA, 2014; pp. 403–409.
15. Blanchard, A.L. The Effects of COVID-19 on Virtual Working within Online Groups. *Group Process. Intergroup Relat.* **2021**, *24*, 290–296. [CrossRef]
16. Schiller, S.Z.; Mennecke, B.E.; Nah, F.F.-H.; Luse, A. Institutional Boundaries and Trust of Virtual Teams in Collaborative Design: An Experimental Study in a Virtual World Environment. *Comput. Hum. Behav.* **2014**, *35*, 565–577. [CrossRef]
17. Mystakidis, S.; Lympouridis, V. Immersive Learning. *Encyclopedia* **2023**, *3*, 396–405. [CrossRef]
18. Müller, R.; Klein, G. The COVID-19 Pandemic and Project Management Research. *Proj. Manag. J.* **2020**, *51*, 579–581. [CrossRef]
19. Whillans, A.; Perlow, L.; Turek, A. Experimenting during the Shift to Virtual Team Work: Learnings from How Teams Adapted Their Activities during the COVID-19 Pandemic. *Inf. Organ.* **2021**, *31*, 100343. [CrossRef]
20. Armenia, S.; Dangelico, R.M.; Nonino, F.; Pompei, A. Sustainable Project Management: A Conceptualization-Oriented Review and a Framework Proposal for Future Studies. *Sustainability* **2019**, *11*, 2664. [CrossRef]
21. Hornbæk, K. Current Practice in Measuring Usability: Challenges to Usability Studies and Research. *Int. J. Hum. Comput. Stud.* **2006**, *64*, 79–102. [CrossRef]
22. Al-Qora'n, L.; Salem, O.A.S.; Gordon, N. Heuristic Evaluation of Microsoft Teams as an Online Teaching Platform: An Educators' Perspective. *Computers* **2022**, *11*, 175. [CrossRef]
23. Schemmer, L.B.; Barros, M.L.; Rezende, R.L.F.; Ferro, T.P.; Aquere, A.L. Perception of Professors and Undergraduate Students of Engineering at the University of Brasilia (UnB) on Emergency Remote Learning Period in the Context of the COVID-19 Pandemic. In Proceedings of the International Symposium on Project Approaches in Engineering Education; Active Learning in Engineering Education Workshop; International Conference on Active Learning in Engineering Education (PAEE/ALE'2021), Braga, Portugal, 7–9 July 2021.
24. Shen, F.; Roccosalvo, J.; Zhang, J.; Tian, Y.; Yi, Y. Online Technological STEM Education Project Management. *Educ. Inf. Technol.* **2023**, *28*, 12715–12735. [CrossRef] [PubMed]
25. Natriello, G.; Chae, H.S. Taking Project-Based Learning Online. In *Innovations in Learning and Technology for the Workplace and Higher Education*; Guralnick, D., Auer, M.E., Poce, A., Eds.; Springer International Publishing: Cham, Switzerland, 2022; pp. 224–236.
26. Mystakidis, S. Motivation Enhancement Methods for Community Building in Extended Reality. In *Augmented and Mixed Reality for Communities*; Fisher, J.A., Ed.; CRC Press: Boca Raton, FL, USA, 2021; pp. 265–282.
27. Abrams, D.; Lalot, F.; Hogg, M.A. Intergroup and Intragroup Dimensions of COVID-19: A Social Identity Perspective on Social Fragmentation and Unity. *Group Process. Intergroup Relat.* **2021**, *24*, 201–209. [CrossRef]

28. Tuckman, B.W. Developmental Sequence in Small Groups. *Psychol. Bull.* **1965**, *63*, 384–399. [CrossRef]
29. Iankilevitch, M. Intergroup Relations Course: Making the Move from In-Person to Online. In *Teaching Psychology Online*; Cerniak, J., Wong, M.S., Rosen, L.H., Eds.; Society for the Teaching of Psychology: Washington, DC, USA, 2021; pp. 264–273.
30. Gast, I.; Schildkamp, K.; van der Veen, J.T. Team-Based Professional Development Interventions in Higher Education: A Systematic Review. *Rev. Educ. Res.* **2017**, *87*, 736–767. [CrossRef]
31. Wetton, R. Managing Virtual Teams: Creating a Virtual Community. In *Intercultural Management in Practice*; Emerald Publishing Limited: Leeds, UK, 2021; pp. 203–211.
32. Hayes, A. Engaging Students through Situated Learning in Game Development: A Case Study of the Global Game Jam & Interdisciplinary Teamwork, and Community Engagement. *Int. J. E-Learn.* **2022**, *21*, 241–250.
33. Nunamaker, J.F.; Reinig, B.A.; Briggs, R.O. Principles for Effective Virtual Teamwork. *Commun. ACM* **2009**, *52*, 113–117. [CrossRef]
34. Super, J.F. Building Innovative Teams: Leadership Strategies across the Various Stages of Team Development. *Bus. Horiz.* **2020**, *63*, 553–563. [CrossRef]
35. Noguera, I.; Guerrero-Roldán, A.-E.; Masó, R. Collaborative Agile Learning in Online Environments: Strategies for Improving Team Regulation and Project Management. *Comput. Educ.* **2018**, *116*, 110–129. [CrossRef]
36. Palkova, Z.; Harnicarova, M.; Valicek, J.; Stehel, V.; Mihailov, N.; Fragkaki, M.; Khalilia, W.M.; Salameh, A.A.K.A. Perspective of Education in Agriculture 4.0 in Selected Countries in European Union and Palestine. In Proceedings of the 2022 8th International Conference on Energy Efficiency and Agricultural Engineering (EE&AE), Ruse, Bulgaria, 30 June–2 July 2022; pp. 1–6.
37. Fragkaki, M.; Mystakidis, S. Distance Higher Education Learning and Professional Pedagogy: Training the Trainers. In Proceedings of the 20th European Conference on e-Learning (ECEL 2021), Berlin, Germany, 28–29 October 2021; Academic Conferences International Limited: Berlin, Germany, 2021; pp. 155–163.
38. Pal, D.; Vanijja, V. Perceived Usability Evaluation of Microsoft Teams as an Online Learning Platform during COVID-19 Using System Usability Scale and Technology Acceptance Model in India. *Child Youth Serv. Rev.* **2020**, *119*, 105535. [CrossRef]
39. Gander, F.; Gaitzsch, I.; Ruch, W. The Relationships of Team Role- and Character Strengths-Balance With Individual and Team-Level Satisfaction and Performance. *Front. Psychol.* **2020**, *11*, 566222. [CrossRef]
40. Collins, D. Pretesting Survey Instruments: An Overview of Cognitive Methods. *Qual. Life Res.* **2003**, *12*, 229–238. [CrossRef]
41. Jaaffar, T.; Samy, N.K. Investigating the Complex Relationships between Leadership, Psychological Safety, Intrinsic Motivation, and Nurses' Voice Behavior in Public Hospitals Using PLS-SEM. *Belitung Nurs. J.* **2023**, *9*, 165–175. [CrossRef]
42. Hair, J.; Hult, T.; Christian, R.; Marko, S. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed.; SAGE Publications: London, UK, 2014.
43. Hair, J.F.; Sarstedt, M.; Ringle, C.M.; Gudergan, S.P. *Advanced Issues in Partial Least Squares Structural Equation Modeling*; SAGE Publications: London, UK, 2017; ISBN 9781483377391.
44. Sarstedt, M.; Ringle, C.M.; Hair, J.F. Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research*; Springer International Publishing: Cham, Switzerland, 2021; pp. 1–47.
45. Hayes, A.F. Partial, Conditional, and Moderated Moderated Mediation: Quantification, Inference, and Interpretation. *Commun. Monogr.* **2018**, *85*, 4–40. [CrossRef]
46. MacKinnon, D.P.; Lockwood, C.M.; Williams, J. Confidence Limits for the Indirect Effect: Distribution of the Product and Resampling Methods. *Multivar. Behav. Res.* **2004**, *39*, 99–128. [CrossRef]
47. Almodaires, A.A.; Almutairi, F.M.; Almsaud, T.E.A. Pre-Service Teachers' Perceptions of the Effectiveness of Microsoft Teams for Remote Learning. *Int. Educ. Stud.* **2021**, *14*, 108. [CrossRef]
48. Laurencia, K.; Sudarto, S. Intention to Use Microsoft Teams in the Online Learning System for Students of Universitas Tarumanagara During the COVID-19 Pandemic. In Proceedings of the International Conference on Economics, Business, Social, and Humanities (ICEBSH 2021), Jakarta, Indonesia, 17–18 February 2021; Volume 570.
49. Yen, T.V.M.; Nhi, N.T.U. The Practice of Online English Teaching and Learning with Microsoft Teams: From Students' View. *AsiaCALL Online J.* **2021**, *12*, 51–57.
50. Freitag, M.; Hofstetter, N. Pandemic Threat and Intergroup Relations: How Negative Emotions Associated with the Threat of COVID-19 Shape Attitudes towards Immigrants. *J. Ethn. Migr. Stud.* **2022**, *48*, 2985–3004. [CrossRef]
51. Bui, H.; Chau, V.S.; Degl'Innocenti, M.; Leone, L.; Vicentini, F. The Resilient Organisation: A Meta-Analysis of the Effect of Communication on Team Diversity and Team Performance. *Appl. Psychol.* **2019**, *68*, 621–657. [CrossRef]
52. Buchal, R.; Songsore, E. Using Microsoft teams to support collaborative knowledge building in the context of sustainability assessment. In Proceedings of the Canadian Engineering Education Association (CEEA), Ottawa, ON, Canada, 8–12 June 2019. [CrossRef]
53. Hargreaves, C.; Clarke, A.P.; Lester, K.R. Microsoft Teams and Team Performance in the COVID-19 Pandemic within an NHS Trust Community Service in North-West England. *Team Perform. Manag. Int. J.* **2022**, *28*, 79–94. [CrossRef]
54. Qaddumi, B.; Ayaad, O.; Al-Ma'aitah, M.A.; Akhu-Zaheya, L.; Alloubani, A. The Factors Affecting Team Effectiveness in Hospitals: The Mediating Role of Using Electronic Collaborative Tools. *J. Interprof. Educ. Pract.* **2021**, *24*, 100449. [CrossRef]