Journal of Ecohumanism
2024
Volume: 3, No: 7, pp. 704 – 711
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i7.4237

The Correlation Between Educational Levels, Fields of Study, and Program Types and the Ability to Work in a Team

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Abstract

The 21st century has rewritten the map of competences. New concepts such as agility, teamwork, project approach and many more have emerged. "Team player" is a typical buzzword in CVs, a term we use to describe ourselves based on our own perceptions. However, team spirit can be influenced by many factors during our studies, not only on the practical side, but also by the nature of the training module. The project approach, and in particular teamwork in the agile methodology, is of particular importance, so its learning and development can be important already during the studies. In our study, we undertake to map out some of the background factors of teamwork as a mystique, based on the results of a primary quantitative study, using statistical methods and correlation quizzes as a function of educational levels and training characteristics.

Keywords: *Team Player, Teamwork, Psychological Safety, Agile.*

Introduction

The main difference between a team and a group is that the group needs at least two people and an appointed leader to manage the work, including setting goals, providing resources and evaluating results. In contrast, in teamwork, the leader may often change during the work process, as team members know who can best perform which task, so the leadership role is shifted to another member during the work process to ensure efficiency. Teamwork is particularly useful when performing complex tasks where novel or multiple solutions are required, while a group should be asked to perform a particular task when the sub-tasks require different expertise, are well-defined, routine activities, or when there is a tight deadline to complete the task (Beck - Bíró, 2022). In contrast to the external pressures and control that characterise teams, the primary motivation of teams is intrinsic motivation, i.e. a strong commitment to a common goal, where each member feels responsible for his/her peers, can contribute to the common knowledge, empowers, encourages and supports the others and has the opportunity to formulate opinions (Nagy, 2024).

Teamwork is a collaborative process that enables ordinary people to achieve extraordinary results (Scarnati, 2001). Psychologically safe teams can take moderate risks, express opinions, be creative and experimental without fear of judgment or failure. In these teams, members feel accepted and valued, and can be themselves without fear of negative consequences for their careers, self-image or status (Evans, 2022). Psychological safety is key to successful teamwork, as several studies have shown that it significantly affects team performance and communication among members (Passariello & Tarrant, 2024).

Psychological safety can provide team members with risk-taking during interpersonal interactions, which is an essential element of effective collaboration (Soola et al, 2021). Contradictory research can also be found. Some studies suggest that psychological safety may directly influence team performance (Budianto et al, 2020), while others suggest that teams' emotional intelligence (EQ) plays a mediating role between psychological safety and the effectiveness of team decisions (Harper & White, 2018; Zhou et al, 2020). The perception, existence and level of psychological safety may also be influenced by team composition, such as gender diversity (Miller et al, 2022).

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Agile as a methodology or philosophy, or it could be called a mindset, refers to a project management strategy for creating a new product in a rapidly changing market, characterised by change, where products are incrementally, iteratively developed, but always with working pieces (Cohn, 2010; Morrison, 2024). By its nature, Agile also places a high priority on teamwork and team accountability.

Observing the 12 points of principles alongside the Agile Manifesto, clusters of principles by topic emerge. Principles for teamwork and communication (Beck, 2001):

"The most effective and efficient method of transferring information within the development team is face-to-face discussion."

"The best architectures, requirements and system designs come from self-organizing teams."

"The team regularly considers ways to increase efficiency and tunes and adjusts its operations accordingly."

People are the key to a successful project, as a well-designed process is worthless if the people involved are not professionally competent. At the same time, hiring the right people is futile if the workflow is not properly designed. People are at their most effective when they can work as part of a team. Cooperation and teamwork can be more important than professional competence or the tools used. Therefore, the team must first be created and optimised, and then the environment must be designed appropriately for this team (Robert & Martin, 2006). One of the most well-known and widely used agile frameworks, Scrum, also places a strong emphasis on the team, defining some core values that include commitment, focus, openness and courage (Schwaber & Sutherland, 2017). The value of respect refers to treating everyone as an equal partner, regardless of age, education or social status. In a Scrum team, team responsibilities are shared and the team's results are the most important (Guthrie, 2022).

Courage means facing difficult challenges without procrastinating or handing them over to a colleague. It also means striving to be open and honest with all stakeholders, without fear. This includes honestly telling team members when something needs to be redone or when processes are not working properly (Kissflow, 2022). Scrum team members are committed to working towards the team's goals and supporting each other. Their primary focus is to work through the Sprint, making the best possible progress towards the goals they have set. The Scrum team and the customers communicate openly about the work and the challenges that arise. Scrum team members view each other with respect and competence, as independent, collaborative colleagues (Schwaber & Sutherland, 2017).

In a self-organizing team, the team decides how to divide the work, who does the tasks and when, and how to respond to change. Decisions are shared decisions of the team, and therefore responsibility is shared. This facilitates internal information flow and gives junior colleagues the opportunity to add value. The team regularly self-reflects and decides for itself how to work more effectively. The team also determines the way in which continuous improvement is carried out, so that decisions can be taken at team level if a problem arises with a team member. In a Scrum team, there is no hierarchy, i.e. no hierarchy of subordinates and superiors (Sidharth, 2019). Cross-functionality means that all team members have the skills, knowledge and abilities needed to create a working, finished product. Teams with this composition can typically deliver completed work in a shorter time and with better quality, as they do not have external dependencies, as all the necessary resources are found within the team (PMI, 2018).

Team and group tasks in higher education also reflect the main essence of teamwork, where several people work together to achieve a goal. Task sharing is key, so it is preferable to have a relatively mixed team composition, which brings in the concept of cross-functionality used in the Scrum framework, i.e. it is not most effective if everyone is good at everything, but if team members have a wide range of competences and specific knowledge. Self-awareness and trustworthiness are important when performing tasks, as the outcome does not depend on individual performance but on the success of the team as a whole (Felvi, 2022). The same phenomenon can be observed in the case of enterprises, where these different competences and knowledge are aggregated within the company, so that the success of company projects and innovation projects can be attributed to the result of teamwork (Skoll, 2024).

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A team has a common goal or mission where team members can develop effective, reciprocal relationships to achieve the team's goals (Harris & Harris, 1996). The success of teamwork depends on a number of complex factors such as effective coordination, mutual trust, team unity, shared leadership and clear definition of common goals. In particular, knowledge coordination plays a prominent role in team performance, which is enhanced by trust and team unity (Paul et al, 2016). A shared leadership model, in which team members take on leadership responsibilities on a periodic basis, can contribute significantly to team performance, especially when strong mutual trust is established between team members. When team members take turns in leadership roles from time to time and also trust each other's abilities, it increases ownership, motivation and team cohesion (Han et al, 2024).

The dynamics of teamwork itself can be highly dynamic in nature and can change significantly over a short period of time. These changes can be related to daily team unity, commitment to work, and the achievement of common goals (Klasmeier & Rowold, 2021).

Trust between teams and the shared leadership model have both direct and indirect effects on team effectiveness. Both factors contribute to improved collaboration, increased commitment and higher performance (Han et al, 2024; Donati, 2013). Clearly defining common goals for teams contributes significantly to strengthening team unity and enhancing team performance. Common goals provide direction for the team, increase motivation and help team members focus on the most important tasks (Widmeyer & Ducharme, 1997).

Material and Method

The research is based on a quantitative sample collected through an online questionnaire in Hungary. The survey was available during the first and second quarter of 2024 for the period of data collection. The target audience is primarily current students studying at any level of education, but the questionnaire also gave the opportunity to be completed by those who had completed their studies, their responses being considered relevant. The aim of the research is to investigate the level of teamwork at different levels of education. The questionnaire was distributed through various education-related forums, mailing lists and university student councils. At the end of the survey period, the number of respondents was 948, which did not require data cleaning and, being completely anonymous, complied with the GDPR. The survey questionnaire was created in the online questionnaire editor Google Forms, followed by data sorting and various designs and preparations in Microsoft 365 Excel spreadsheet and statistical analyses in IBM SPSS statistical software. The tests and measures used in the statistical analyses were: mean, standard deviation, minimum, maximum, confidence intervals, histogram, one-way ANOVA, two-way ANOVA, Tukey HSD post-hoc test, independent samples t-test, effect size calculation (Cohen's d, Hedges' correction).

Research

The aim of the research was to examine whether there are differences in team play among different educational levels, divisions, and fields within educational institutions. Based on the responses of 948 participants to the question "How much do you consider yourself a good team player?" in the questionnaire, the team player scores ranged between 1 and 4, with an average score of 3.30 (standard deviation=0.738). This indicates that respondents generally rated their own team play abilities positively, as the average is closer to the upper value (4) than the lower value (1). The relatively low standard deviation suggests that most responses are close to the average, indicating that respondents' opinions do not differ significantly from each other on this question.

The distribution of the dependent variable "Team Player Score" was examined using a histogram and a normal distribution curve. Based on the results, the average team player score was 3.30 (standard deviation=0.738)

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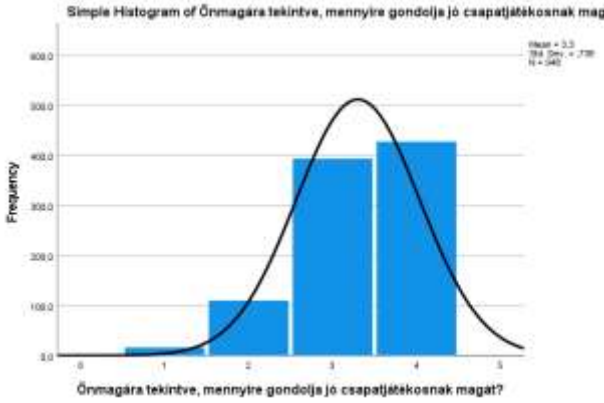

1. **Figure:** Level Of Team Play (Source: Own Research, Ibm Spss, 2024q2, N=248)

The histogram shows that the data distribution is relatively symmetrical and approximates a normal distribution. The central tendency of the distribution indicates that most respondents rated themselves highly in terms of team play, with the most common scores being 3 and 4. The normal distribution curve fits the data well, suggesting that the data distribution roughly follows a normal distribution. The distribution is slightly skewed to the left, indicating that a few respondents gave themselves lower scores, but these values are not significant when considering the entire sample. The analysis of the distribution reveals no significant outliers, further supporting the reliability of the results. Based on the spread and central tendency of the data, it can be concluded that the majority of respondents positively evaluate their own team play abilities.

The first analysis aimed to determine whether there is a significant difference in how students at different educational levels perceive themselves as team players. An ANOVA (Analysis of Variance) [20] test was applied to analyze whether the means among different educational levels differ statistically significantly from each other. Based on the responses, the studies were categorized into four levels: secondary school or high school, non-degree programs (higher education vocational training), bachelor's degree programs, and postgraduate programs (master's, postgraduate, and doctoral programs).

1. Table: Descriptive Statistics: Team Player Scores by Educational Levels

	N	Mean	Std. Deviation
Secondary school / high school	124	3,31	0,712
Non-degree program	348	3,29	0,765
Bachelor's degree program	376	3,26	0,724
Postgraduate program	100	3,50	0,704
Total	948	3,30	0,738

Source: Own research: 2024Q2, N=948

Based on the average team player scores, it can be determined that students in postgraduate programs rate themselves the highest as team players (3.50), while students in bachelor's degree programs rate themselves the lowest (3.26). The average scores of the other groups fall between these two. The results suggest that the level of education may influence individuals' self-assessment as team players. Participants in postgraduate programs generally rate their team play abilities higher, while those in bachelor's degree programs rate themselves lower. The ANOVA table presents the sources of variance between the educational levels, degrees of freedom (df), sum of squares, mean square, F-statistic, and significance value (Sig.).

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2. Table: Anova Analysis: Team Player Scores And Education Level

Source	Sum of Squares	df	Mean Square	F	Sig.
Between groups	4.641	3	1.547	2.857	0.036
Within groups	511.077	944	0.541		
Total	515.717	947			

Source: Own research: 2024Q2, N=947

The difference between educational levels is significant (Sig=0.036), indicating a statistically significant difference in team player scores among the different educational levels. Since the ANOVA test indicated a statistically significant difference in team player scores among the different educational levels, a Tukey post hoc test [21] was performed to identify which groups had these differences. The Tukey test revealed a significant difference between postgraduate and bachelor's degree programs (Sig=0.020), with postgraduate students achieving higher team player scores. In addition to the level of studies, the type of studies was also examined. Responses were categorized into three groups: secondary school or high school studies, economic studies, and other studies.

3. Table: Descriptive Statistics: Team Player Scores By Educational Fields

	N	Mean	Std. Deviation
Secondary school / high school	82	3,32	0,683
Economics	526	3,33	0,742
Other sciences, fields	340	3,25	0,743
Total	948	3,30	0,738

Source: Own research: 2024Q2, N=948

4. Table: Anova Analysis: Team Player Scores And Education Field

Source	Sum of Squares	Df	Mean Square	F	Sig.
Between groups	1,604	2	0,802	1,474	0,230
Within groups	514,113	945	0,544		
Total	515,717	947			

Source: Own research: 2024Q2, N=947

Based on the results of the ANOVA analysis, there is no significant difference in team player scores among the different fields of study. Descriptive statistics show that the highest average team player score was achieved by students in economics (mean = 3.33, standard deviation = 0.742), while the lowest score was recorded by students in other sciences and fields (mean = 3.25, standard deviation = 0.743). According to the Tukey post hoc test results, there is no significant difference in team player scores among the different fields of study. This indicates that the respondents' field of study does not significantly impact their self-assessment of team player abilities. To examine the type of study program (full-time or other), an independent samples t-test was conducted.

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5. Table: Descriptive Statistic: Team Player Scores By Study Program

	N	Mean	Std. Deviation
Full-time	668	3,25	0,738
Other	280	3,44	0,721

Source: Own research: 2024Q2, N=947

Levene's Test for Equality of Variances:

- F-value: 0.263
- Sig. value: 0.608
- t-test for Equality of Means:
- Equal variances assumed:

    t-value: -3.644

    df: 946

    Sig. (2-tailed): 0.000

    Mean Difference: -0.190

    Std. Error Difference: 0.052

    95% Confidence Interval: -0.293 to -0.088

The Levene's test is not significant (Sig = 0.608), which indicates that equal variances can be assumed between the groups of full-time and other students. Therefore, the results under "Equal variances assumed" should be considered.

Equal variances not assumed:

- t-value: -3.681
- df: 535.363
- Sig. (2-tailed): 0.000
- Mean Difference: -0.190
- Std. Error Difference: 0.052
- 95% Confidence Interval: -0.292 - -0.089

The test results show a significant difference in team player scores between full-time and other types of students. The average team player score for students in other programs is 3.44 (standard deviation = 0.721), while the average score for full-time students is 3.25 (standard deviation = 0.738).

The effect size is medium, as indicated by Cohen's d (-0.259) and Hedges' correction (-0.259). This means that students in other programs rate their team play abilities significantly higher than full-time students.

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Conclusion

Regarding how respondents perceive themselves as team players, the majority gave themselves high scores. Significant differences in the degree of team play were observed concerning educational attributes. The research showed measurable results for the level and type of studies, while no significant differences were found regarding the field of study. This suggests that the discipline itself does not affect team player abilities. Compared to full-time students, those in other programs scored higher, indicating that these students feel more comfortable as team players than their full-time counterparts. This may be because these students typically work alongside their studies and likely engage in team-based work environments, thus continuously practicing teamwork.

Students in postgraduate programs generally scored higher, while those in non-degree programs and secondary school studies rated themselves higher than those in bachelor's degree programs. Pairwise comparisons revealed a significant difference between postgraduate and bachelor's degree programs, with postgraduate students achieving higher team player scores. This can be explained by the fact that these respondents have already completed a degree, during which they likely participated in more group tasks, gaining more experience in this area. Therefore, it may be beneficial to place greater emphasis on teamwork and group tasks in bachelor's degree programs.

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