

Statistical Model for Evaluating the Organizational Behaviour System in Online-Onsite Environments

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Abstract. *The study of organizational behaviour is essential for human resource managers to improve organizational efficiency, aiming to create a conducive working environment to stimulate employee engagement within the organization. By understanding the factors influencing behaviour in organizations, more effective strategies can be implemented for managing people and resources. The current research statistically models a system of individual-centred organizational behaviour [OB] in relation to influencing variables - online [MON] and hybrid [MOh] relational environments. The systemic variable [OB] is analyzed from the perspective of three dimensions - the individual's relationship with the group they belong to [group-focused behaviour], the individual's relationship with themselves [individual-focused behaviour], and the relationship between the individual and the tasks they have to solve [task-focused behaviour]. This system is statistically modelled through the analysis of influencing factors in online and offline relationships. The current research includes an analysis of statistical modelling applied to two heterogeneous groups of students and the comparison of regression models on the two systems [OB]-[MON] and [OB]-[MOh]. The research methodology includes the presentation of statistical data, formulation of working hypotheses, questionnaire component, application to the two groups of respondents, creation of systemic variables, analysis of variable distributions, correlational analysis, application of statistical regression, and formulation of conclusions and observations. The limitations of the research, the applicability and versatility of its methodology, and future research directions in this field are highlighted in the conclusion of the work.*

Keywords: statistical model, organizational behaviour, online-onsite environments, statistical regression

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Introduction

Organizational behaviour [OB] represents how people interact within organizations. This field addresses aspects such as group dynamics (Cheri et al., 2020) – the interaction and influence relationships among group members, group communication (Luo et al., 2021; Fujishin, 2023) – the communication and collaboration processes among group members (information flows within the organization), organizational structure (Schulman, 2020; Soderstrom et al., 2020) – the ways tasks, authority, and responsibilities are organized within the organization, conflict management (Eke et al., 2020; Todorova et al., 2021) – the ways conflicts are managed and resolved at an individual level, organizational culture (Akpa et al., 2021; Assoratgoon et al., 2023) – the values, norms, and practices that define organizational culture, and individual elements (Smallfield & Kluemper, 2021; Kammeyer-Mueller, 2023; Griffin, 2020) – personality, attitude, and motivation.

Studying these components helps understand and improve organizational efficiency, human resource management, and employee satisfaction.

In this paper, we aimed to study the phenomenon of organizational behaviour from a triple perspective: group dynamics (interaction relationships), group communication (communication processes), and organizational structure (ways tasks are organized) projected onto our model characterized by four dimensions: the relationship between the individual and the group, the relationship between the individual and the work environment, individual and social perspective, and the role of organizational learning, the latter being analyzed as an influencing dimension. Figure 1 summarizes the proposed conceptual model that was subsequently quantitatively analyzed.

The research analyzes online and hybrid learning systems - combining the two education systems, online and onsite, from the perspective of the organizational learning process characterized by two components (Morris&Rohs, 2023; Lemmetty&Collin, 2020): direct learning and social learning. Suppose the first type of learning refers to the direct transmission of information from sender to receiver, specific to online and onsite education. In that case, social learning encompasses two more difficult elements to quantify and belong exclusively to onsite education: learning by imitation and self-adaptive learning (self-consolidating one's behaviour). We will include these components of the learning process in our study, proposed for quantitative evaluation (Figure 1).

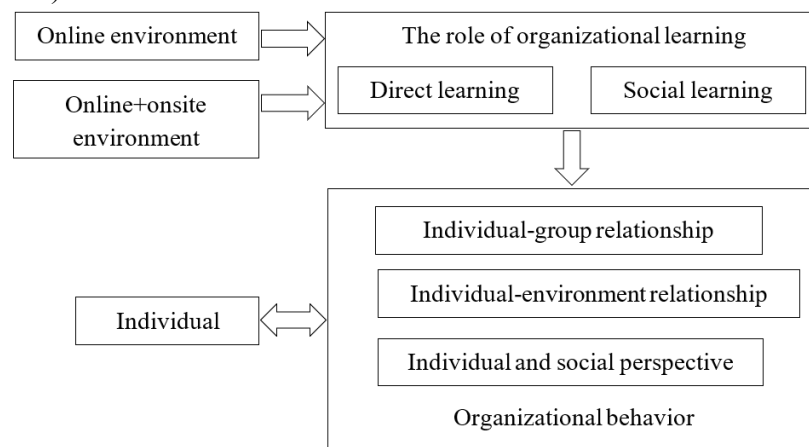


Figure 1. Analysis Model [OB]-[MOn]-[MOs]

Source: Authors' own research.

We will quantitatively analyze the qualitative model proposed in Figure 1 through a systemic approach with input, output, and system variables (Figure 2). The evaluation variable is the individual's task-focused organizational behaviour, and the modelling variable is the type of organizational learning in the two online and hybrid learning systems.

Essentially, this research aims to analyze the influence of online and onsite learning environments on individual behaviour within the group (Hellriegel, 1998). The systemic variables presented in Figure 2 are [CT] = task-focused behaviour, [CR] = relationship-focused behaviour, and [CP] = personal concern-focused behaviour.

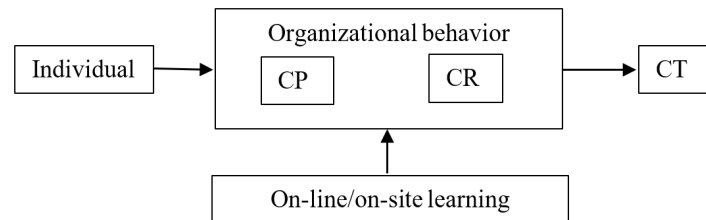


Figure 2. Open system for evaluating [OB]

Source: Authors' own research.

Dimension [CT] is characterized by the following aspects: initiative (item CT1), task presentation (item CT2), understanding and clarification of tasks (items CT3), evaluation of problems and solution methods (items CT4, CT5), attention to task completion by the group (items CT6, CT7, CT8). Dimension [CR] is analyzed from the perspective of the following aspects: encouragement of group members (items CR1, CR5) and conflict mitigation within the group (items CR2, CR3, CR4). Dimension [CP] is characterized by the following aspects: manifestation of hostility (CP1, CP4, CP5), seeking self-appreciation (item CP2), and avoidance of involvement (item CP4). All items of dimension [CP] are reversed. All these three dimensions will form the variables of the [OB] system. This will be modelled through logistic regression. Statistical analysis is performed comparatively on two groups of respondents from different learning environments: group 1 hybrid system (physical and online) and group 2 utterly online system. Thus, the moderating behaviour of the online/hybrid learning system on [OB] is analyzed by comparing the two statistical expressions resulting from applying logistic regression.

The working hypotheses in this research are as follows:

- H1. The online environment influences the component characteristics of [OB].
- H2. The social component in the online learning system is cancelled.
- H3. Group relationship-oriented behaviour is more present in the onsite and hybrid systems compared to the online educational system.
- H4. Personal-focused behaviour in [OB] is cancelled for the hybrid model.

The valorization of the research is projected at the applicative level by elaborating a qualitative and quantitative analysis of modelling organizational behaviour to enhance organizational activities and recommend it for implementation in educational and economic institutions, and at the theoretical and methodological level by using questionnaire-based research and applying statistical modelling methods.

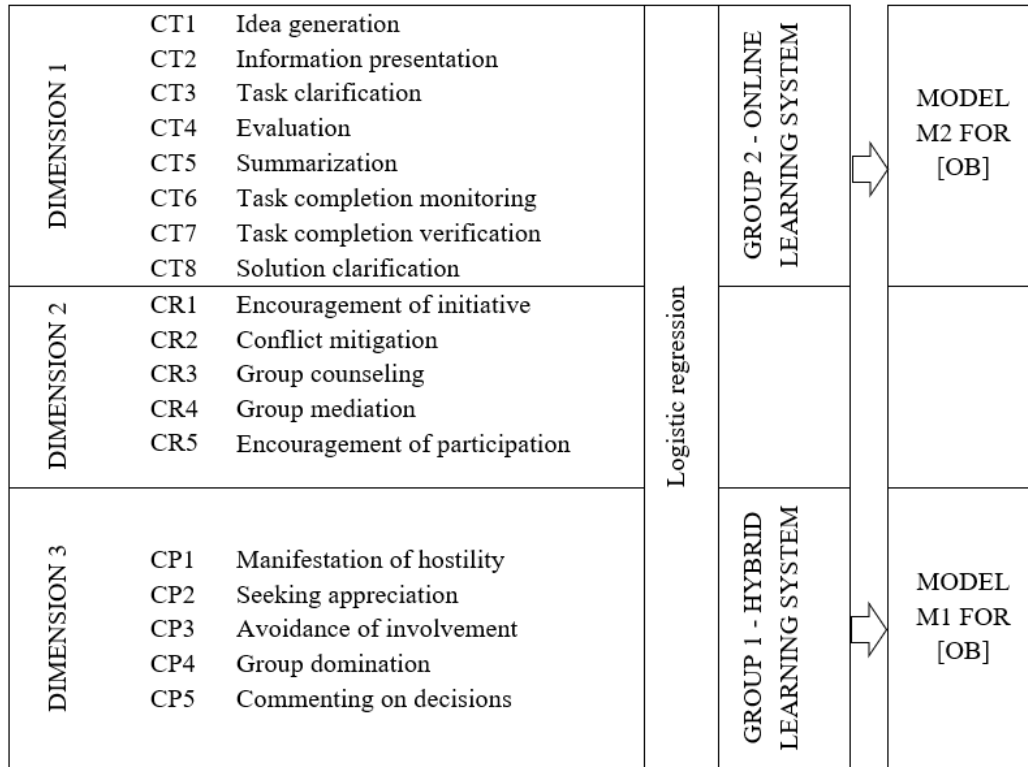


Figure 3. Methodology for modelling the variable [OB]

Source: Authors' own research.

Methodology

In the research, statistical analysis based on a questionnaire was used to assess the influence of the online/hybrid learning system on individual behaviour dynamics in an organizational environment.

The questionnaire contains 18 items, each being quantified ordinally with integer values from 1 to 5, with the minimum value representing "total disagreement" and the maximum value representing "total agreement". The questionnaires were completed by two heterogeneous groups of students from the DIMA and IEEIA faculties within the "Gh. Asachi" Technical University of Iasi during the period 2021-2023, the first group being included in an online education system and the second group in a hybrid learning system (40% online, 60% onsite). The distribution of respondents is presented in Table 1.

Table 1. Distribution of respondents

		Sex		Total
		F	M	
EdS	Online	65	39	104
	Hybrid	53	30	83
Total		118	69	187

Source: Authors' own research.

The statistical methods applied in the research are included in the IBM SPSS Statistics v22 package:

- K-S tests for evaluating the normality of value series

- Non-parametric tests for comparing value series, respectively, the Mann-Whitney U test for the equality of the ranks of the means on two independent samples from the series whose distribution is different from the normal one.
- Logistic regression methods.

Results and discussions

Comparative analysis of the influence of the Learning System on Organizational Behavior

In Table 2, the eight aspects of the [CT] dimension are compared across the two groups of respondents to highlight the extent of the influence of the education system on task-focused organizational behaviour. It is observed that five aspects of the [CT] dimension have different structures regarding response patterns: [CT2], [CT4], [CT6], [CT7], and [CT8]. Different influences of the online learning environment on task-focused individual behaviour within the group can be observed - aspects of "information presentation" [CT2], "attention to task completion" [CT6], "task completion verification" [CT7], and "solution clarification" [CT8] lose their importance in the online environment compared to the hybrid one, as the social interaction component is missing.

The aspect of "task evaluation" [CT4] is more active in the online system, explained by the generation of additional mechanisms for task evaluation specific to the online environment. In conclusion, the [CT] dimension is strongly influenced by the type of learning - reducing the level of individual action within the group on the task to be solved and emphasizing aspects related to the use of new mechanisms specific to the online system – evaluation, testing.

Regarding aspects [CT1] – idea generation, [CT3] – task clarification, and [CT5] – summarization, the response structure is approximately the same, with a pronounced individual character.

In Table 3, a comparative analysis of the influence of the learning system on individual behaviour within the group is conducted. The analysis led to an unexpected result, namely the refutation, in most of the treated aspects, of the initially formulated hypothesis that response series have different distributions across the two groups of respondents. Apart from the aspect of "group mediation", all other aspects "Encouragement of initiative", "Conflict mitigation", "Group counselling", and "Encouragement of participation", have approximately the same distribution of responses. This is encouraging and can be justified because the online environment has its own quickly learned mechanisms that can function effectively within the group. The "group mediation" aspect is the only one with a different response structure across the two groups, which is motivated by the lack of standardized mediation processes in the online environment.

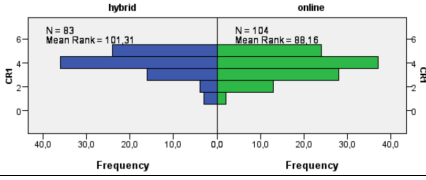
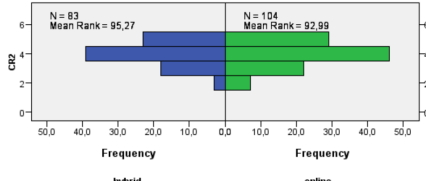
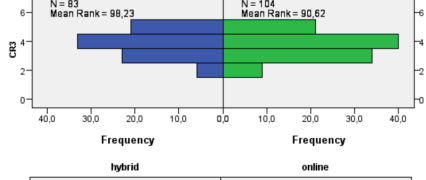
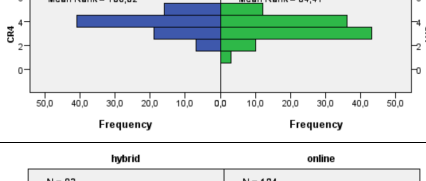
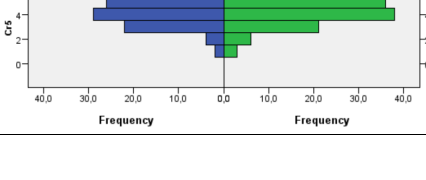
Regarding the third dimension analyzed [CP] (Table 4), things are entirely different compared to the previous dimensions. In the case of individual behaviour oriented towards oneself, from the perspective of "hostility" and "seeking appreciation," the online environment generates an increase in the effect of these states by inhibiting social interaction and projecting them onto online networking platforms, where protection and social inhibition mechanisms are unclear or not implemented. The aspects of "Avoidance of involvement" and "Group domination" are influenced differently by the two environments, being more prevalent in the onsite and hybrid environments. In contrast, "commenting on decisions" has the same structure for both learning environments.

Table 2. Comparative analysis of the distributions of [CT] dimension aspects across online hybrid categories

Null Hypothesis	The structure of the answer ranks	Sig.	Decision
The distribution of CT1 is the same across categories of EdS.		0.111	Retain the null hypothesis.
The distribution of CT2 is the same across categories of EdS.		0.000	Reject the null hypothesis.
The distribution of CT3 is the same across categories of EdS.		0.129	Retain the null hypothesis.
The distribution of CT4 is the same across categories of EdS.		0.000	Reject the null hypothesis.
The distribution of CT5 is the same across categories of EdS.		0.739	Retain the null hypothesis.
The distribution of CT6 is the same across categories of EdS.		0.000	Reject the null hypothesis.
The distribution of CT7 is the same across categories of EdS.		0.025	Reject the null hypothesis.
The distribution of CT8 is the same across categories of EdS.		0.009	Reject the null hypothesis.

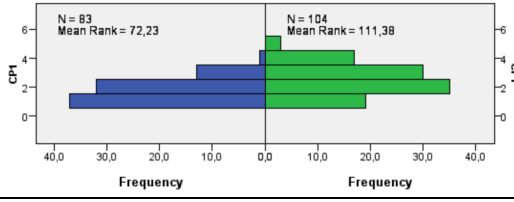
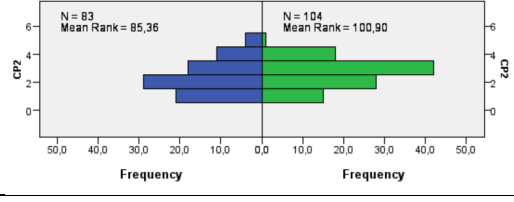
Source: Authors' own research.

Table 3. Comparative analysis of [CR] dimension aspects distributions across Online-Hybrid categories.

Null Hypothesis	The structure of the answer ranks	Sig.	Decision
The distribution of CR1 is the same across categories of EdS.		0.084	Retain the null hypothesis.
The distribution of CR2 is the same across categories of EdS.		0.760	Retain the null hypothesis.
The distribution of CR3 is the same across categories of EdS.		0.314	Retain the null hypothesis.
The distribution of CR4 is the same across categories of EdS.		0.004	Reject the null hypothesis.
The distribution of CR5 is the same across categories of EdS.		0.562	Retain the null hypothesis.

Source: Authors' own research.

Table 4. Comparative analysis of the distributions of [CP] dimension aspects across Online-Hybrid Categories

The distribution of CP1 is the same across categories of EdS.		0.000	Reject the null hypothesis.
The distribution of CP2 is the same across categories of EdS.		0.043	Reject the null hypothesis.

The distribution of CP3 is the same across categories of EdS.		0.003	Reject the null hypothesis.
The distribution of CP4 is the same across categories of EdS.		0.032	Reject the null hypothesis.
The distribution of CP5 is the same across categories of EdS.		0.908	Retain the null hypothesis.

Source: Authors' own research.

Creating the [OB] Model

The dimensions forming the system variables are [CT] task-focused behaviour as the dependent variable, group relationship-focused behaviour [CR], and personal concern-focused behaviour [CP] = 2 independent variables. The eight items characterize the output variable [CT], while the input variables [CR] and [CP] (independent variables) consist of 5 items each.

The proposed statistical model is a linear one of the form $[CT] = \alpha_1 * [CR] + \alpha_2 * [CP]$ where $[CT] = \frac{\sum_{i=1}^8 CT_i}{8}$, $[CR] = \frac{\sum_{i=1}^5 CR_i}{5}$, $[CP] = \frac{\sum_{i=1}^5 CP_i}{5}$

The correlation analysis between the value series for the three working variables is presented in Table 5.

Table 5. Correlation Matrix for the Three Variables

Correlations					
Spearman's rho	[CT]		[CR]	[CS]	[CP]
		Correlation Coefficient	1.000	0.551	-0.332
		Sig. (2-tailed)		0.000	0.031
	[CR]	Correlation Coefficient	0.551	1.000	-0.421
		Sig. (2-tailed)	0.000		0.006
	[CP]	Correlation Coefficient	-0.332	-0.421	1.000
		Sig. (2-tailed)	0.031	0.006	

Source: Authors' own research.

A positive correlation between [CT] and [CR] can be observed, a negative correlation between [CP] and [CT], and a negative correlation between [CP] and [CR]. The intensity of these correlations will be analyzed in the next step. The Spearman correlation coefficient was used for series that are not normally distributed (Table 6).

Table 6. Normality testing of the three variables

	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
[CT]	0.150	187	0.016
[CR]	0.107	187	0.200
[CP]	0.130	187	0.069

Source: Authors' own research.

For modelling, logistic regression methods will be used because the value series are not normally distributed, and the adequacy of the regression model for group 1 - hybrid learning is presented in Table 7.

Table 7. Adequacy of the regression model for group 1 - hybrid learning

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	201.235			
Final	187.391	18.853	2	0.000
Link function: Logit.				

Source: Authors' own research.

Table 8. Coefficients of the logistic regression model for group 1 - hybrid learning

		Estimate	Std. Error	Sig.
Dimensions	[CR]	1.472	0.472	0.002
	[CP]	-.816	0.418	0.05

Source: Authors' own research.

According to the results of the logistic regression application (Table 8), the coefficients of the statistical model are significant ($p_values \leq 0.5$).

The model for the first hybrid group is

$$[CT] = 1.472*[CR] - 0.816*[CP].$$

The model corresponds to the actual state in that an increase in the [CR] variable (effective communication within the group) corresponds to an increased dimension of the [CT] variable (group task resolution), while an increase in the [CP] variable (personal-focused behaviour) will lead to lower values of the [CT] variable. Thus, from an organizational point of view, group relationships are positively correlated with efficient task resolution within the group. The coefficient weighting the [CP] variable is negative, confirming the negative correlation relationship between the two variables.

It is also observed that the coefficient weighting the [CR] dimension is almost double, in absolute value, compared to the coefficient of the [CP] dimension, indicating that the group cohesion dimension is more important than the personal dimension in modelling organizational behaviour.

The results of the KS test applied to the online group are presented in Table 9.

Table 9. Normality testing of variables for the second group (online education) of respondents

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
[CT]	0.095	187	0.234
[CR]	0.129	187	0.012
[CP]	0.143	186	0.020

Source: Authors' own research.

It is observed that the [CT] variable is distributed differently from a theoretical normal distribution, which leads to the continued use of an ordinal regression method.

Table 10. Adequacy of the regression model for group 2 - online learning.

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	269,969			
Final	252,081	17,888	2	,000
Link function: Logit.				

Source: Authors' own research.

According to the coefficient Sig=0.00001 from Table 10, the ordinal regression model for the group that learned online is adequate.

Table 11. Coefficients of the ordinal regression model for group 2 - the online system

		Estimate	Std. Error	Sig.
Location	[CR]	20.027	0.498	0.518
	[CP]	-0.138	0.286	0.000

Source: Authors' own research.

In Table 11, it is observed that the coefficient [CR] is not significant ($p_value=0.518>0.05$), so for the regression model, the [CR] dimension will not be included in the mathematical expression of the [CT] variable.

The model is described by the following expression:

$$[CT] = -1.138 * [CP].$$

It can be observed that the online environment, compared to the hybrid one, led to statistical modelling of organizational behaviour based on a single dimension [CP] (personal-focused dimension). This variable numerically quantifies the relationship between the individual and the group they belong to. The [CR] variable is absent from the resulting model, a fact argued by the difficulty of validating interpersonal relationships within the group in the online environment.

Conclusion

Organizational behaviour, as a system variable, is a challenge for any modelling process characterized by high complexity involving many social and psychological variables that frequently change over time. The current research has shown that self-valuation within the group is more prevalent in the online model, explained by the lack of socialization within the group and the explosion of online social platforms. The limitation of this research stems from the fact that respondents are different in the two groups, so we cannot analyze the dynamics of the organizational behaviour dimension over time.

Future research directions are unlimited both from the perspective of the large number of dimensions characterizing the [OB] variable and from the fact that this variable has distinct peculiarities specific to each organizational system.

References

Akpa, V. O., Asikhia, Olalekan U., Nneji, Ngozi Evangeline (2021). Organizational Culture and Organizational Performance: A Review of Literature, *International Journal of Advances in*

- Engineering and Management (IJAEM)* Volume 3, Issue 1 Jan-Feb 2021, pp: 361-372, ISSN: 2395-5252, Accepted: 30-01-2021, DOI: 10.35629/5252-0301361372.
- Cheri L. Marmarosh, Donelson R. Forsyth, Bernhard Strauss, Gary M. Burlingame (2020). The Psychology of the COVID-19 Pandemic: A Group-Level Perspective, © 2020 *American Psychological Association* 2020, Vol. 24, No. 3, 122–138 ISSN: 1089–2699, <http://dx.doi.org/10.1037/gdn0000142>.
- Don Hellriegel, John W. Slocum, Richard W. Woodman (1998). *Organizational Behavior*, South-Western College Pub., 1998 - Business & Economics - 635 pages.
- Gergana Todorova, Kenneth T. GOH, Laurie WEINGART (2021). The effects of conflict type and conflict expression intensity on conflict management, Published in *International Journal of Conflict Management*, 2021 October, <https://doi.org/10.1108/IJCMA-03-2021-0042>.
- Jarvis Smallfield & Donald H. Kluemper (2021). An Explanation of Personality Change in Organizational Science: Personality as an Outcome of Workplace Stress, *Journal of Management*, Volume 48, Issue 4, <https://doi.org/10.1177/01492063219984>.
- John Eke, Ebere Chika, Akintokunbo, Oluwarotimi Odunayo (2020). Conflict Management as a Tool for Increasing Organizational Effectiveness: A Review of Literature, *International Journal of Academic Research in Business and Social Sciences* Vol. 10, No. 5, May 2020, E-ISSN: 2222-6990 © 2020 HRMARS, Pg. 299 - 311 Accepted: April 26 2020, DOI:10.6007/IJARBS/v10-i5/7198.
- John D. Kammeyer-Mueller, Alex L. Rubenstein, and Tianna S. Barnes (2023). The Role of Attitudes in Work Behavior, *Annual Review of Organizational Psychology and Organizational Behavior* Vol. 11, 01. 2024, Review in Advance first posted online on November 14, 2023, <https://doi.org/10.1146/annurev-orgpsych-101022-101333>.
- Paul R. Schulman (2020). Organizational structure and safety culture: Conceptual and practical challenges, *Safety Science*, Volume 126, June 2020, 104669, <https://doi.org/10.1016/j.ssci.2020.104669>.
- Randy Fujishin (2023). Creating Effective Groups: The Art of Small Group Communication, *Book published by Rowman & Littlefield*, 2023.
- Ricky W. Griffin, Jean M. Phillips, Stanley M. Gully (2020). Organizational behaviour - managing people and organizations, book, *Chapter 5: Motivating Behavior*, pp. 158–194, Copyright 2020 Cengage Learning.
- Sara B. Soderstrom and Klaus Weber (2020). Organizational Structure from Interaction: Evidence from Corporate Sustainability Efforts, *Administrative Science Quarterly* 2020, Vol. 65(1)226–271, DOI: 10.1177/0001839219836670.
- Soila Lemmetty, Kaija Collin (2020). Self-Directed Learning as a Practice of Workplace Learning: Interpretative Repertoires of Self-Directed Learning in ICT Work, *Vocations and Learning* (2020) 13:47–70 <https://doi.org/10.1007/s12186-019-09228-x>.
- Thomas Howard Morris, Matthias Rohs (2023). The potential for digital technology to support self-directed learning in the formal education of children: a scoping review, *Interactive Learning Environments* Volume 31, Issue 4, 2023.
- Waewkanee Assaratgoon, Sooksan Kantabutra (2023). Toward a sustainability organizational culture model, *Journal of Cleaner Production*, Volume 400, May 10 2023, 136666, <https://doi.org/10.1016/j.jclepro.2023.136666>.
- Yi Luo, Cong Han, & Nima Mesgarani (2021). Group Communication With Context Codec for Lightweight Source Separation, *IEEE/ACM Transactions On Audio, Speech, And Language Processing*, vol. 29, 2021, DOI: 10.1109/TASLP.2021.3078640.