





Learning Time Analysis - Case Study in the IT Sector in the Czech Republic

Vaclav Zubr^(✉)  and Hana Mohelska^(✉) 

Faculty of Informatics and Management, The University of Hradec Kralove,
Hradec Kralove, Czech Republic
{vaclav.zubr, hana.mohelska}@uhk.cz

Abstract. For learning organisations, acquiring knowledge is one of the key activities. Then for example, the acquired knowledge will allow organisations greater flexibility or a strategic advantage. As small and medium-sized organisations in the Czech Republic are of great importance from the employment of people viewpoint, this survey is focused on education in these organisations. The aim of this study is to evaluate learning time in small and medium-sized organizations in the Czech Republic and to compare the learning time of general staff and managers in these organizations. When comparing results with foreign studies, it can be argued that the results obtained correlate with each other and are satisfactory. In this study, there was a statistically significant difference found between people who are learning at least 1–10 h per month and those who are not. At the same time, the positive influence of learning on the evaluation of some dimensions was found.

Keywords: IT sector · Learning time · Small and medium-sized organizations
General staff learning · Managers' learning

1 Introduction

The definition of a “learning organisation” has been described by several authors over the years. For example, a learning organisation is defined in the book of *The Fifth Discipline* by Peter Senge as: “... an organisation whereby people continually improve their abilities and achieve the results they truly desire where they find support, new and dynamic models of thinking where collective thinking and inspiration are very welcome, and where people still learn how to learn [14].”

From other sources, a learning organisation can be characterised as an organisation that acquires knowledge and innovates fast enough to survive and prosper in a rapidly changing environment, supports continuous employee education, critical thinking as well as risk-taking in the application of new ideas, as well as the dissemination of new knowledge for an organisation in order to incorporate them into day-to-day activities [3]. Learning then becomes an integral part of the whole work process. Work and learning are interconnected in the process of continual improvement. A learning organisation doesn't rely on learning as a by-product of routine work but is actively supported, facilitated and rewarded. Interaction between individuals is then a key aspect of organisational learning [1, 17].

According to several studies, more factors are involved in good functioning of the learning organisation concept (management, learning communities, inner compliance, empowering individuals, organising culture, self-development, teamwork, sharing information, creating knowledge, building reliable learning dimensions and innovation or facilitating leadership) [19]. Learning is one of the basic activities for the learning organisation concept and can be carried out at individual, group or organisational levels [18].

Organisational learning is the result of an interactive and interdependent process. This type of learning is based on organisational memory (past knowledge and experience) and is carried out through common knowledge and mental models of individual company members. Individuals and groups in the organisation are articles through which organisational learning takes place [8, 9].

1.1 Small and Medium-Sized Organizations in the Czech Republic

The importance of small and medium-sized organizations in the Czech Republic is relatively high given the high percentage of people they employ (more than 70% of employees in the private sector) [5].

Small and medium-sized organizations are defined as organizations that employ up to 250 people. In detail, small and medium-sized organizations can be divided into small enter-prises (also micro-companies) with 1 to 9 employees, small organizations with 10 to 49 employees and medium organizations employ between 50 and 250 people [4, 5].

1.2 Measurement of Learning Organisation

We can use a large number of tools to measure and diagnose learning organisations. The used tool depends on the different definitions of the learning organisation. The definition of learning organisation by Marsick and Watkins [15] is also one of these tools (Tables 1 and 2).

Table 1. Seven learning organisation dimensions

No of dimension	Name
1	Create continuous learning opportunities
2	Promote inquiry and dialogue
3	Encourage collaboration and team learning
4	Create systems to capture and share learning
5	Empower people toward a collective vision
6	Connect the organisation to its environment
7	Provide strategic leadership for learning

Source: own processing by [7, 9]

According to Marsick and Watkins, there are seven dimensions that characterise the learning organisation culture. Individual dimensions then represent the efforts of organisations to create learning opportunities for all employees, the effort to create a platform supporting dialogues, reactions and experiments among members, team learning, vision sharing or strategic leadership [12].

All dimensions are interconnected, which can aggravate statistical evaluation of analyses [16]. When comparing organisations with dimensions, we can see a correlation between dimensions and knowledge and financial performance [9, 13].

In the Czech Republic, the topics of introducing a learning organisation and the level of learning in organisations haven't been significantly addressed yet. The missing data about learning situation in organizations can lead to worsen market position of the organization. Therefore the aim of this study is to evaluate learning time in small and medium-sized organizations in the Czech Republic and to compare the learning time of general staff and managers in these organizations. According to the published foreign studies [16], using the Dimension of a Learning Organisation questionnaire seems to be satisfying tool to evaluate the level of learning in organizations. To maintain the validity of this study it was conducted the cross-section questionnaire survey with using the Dimensions of a Learning Organization questionnaire.

2 Methodology

At the beginning of the research, an in-depth data analysis was carried out analysing articles from books and journals searched using web databases (Web of Science, Scopus, Sage Journals, Emerald Insight, Science Direct, Wiley Online Library, Taylor & Francis, etc.) with related issues. Based on the synthesis of the obtained data, the search keywords were chosen: learning organisation, learning organisation performance, building a learning organisation, DLOQ, Dimensions of a learning organisation questionnaire study, etc.

To comparison this study with published foreign studies [16] a cross-section questionnaire survey was conducted between December 2017 and February 2018. This survey was focused on small and medium-sized organizations in the IT sector in the Czech Republic. The respondents were sent a questionnaire via e-mail addresses obtained from the Albertina Business and Marketing Database [2]. The size of the organization and the sector of activity were selected as a business selection criterion. The business sectors were entered by the CZ-NACE code, the predominant activity, specifically [10]:

J – Information and communication activities – 62.0 – Activities in the Information Technology field – 62.01 – Programming - 62.02 – Information Technology Consultancy - 62.03 – Computer Equipment Management – 62.09 – Other IT activities

For this survey, a Dimension of a Learning Organisation questionnaire was selected in a 21-issue questionnaire version focusing on the 7 dimensions of a learning organisation [9]. Thanks to its expansion, this questionnaire is easily comparable to foreign studies. This questionnaire also provides adequate measurement results with its focus on the seven dimensions of a learning organisation. To maintain the validity of the questionnaire, the questionnaire was translated by two independent translators from English into Czech and then back to English. At the same time, retaining the meaning

of the questionnaire was considered. For each dimension, Cronbach confidence coefficient was calculated using IBM SPSS Statistics Version 24. The Alpha coefficient ranged from 0.683 to 0.860 for each dimension. Overall, the value of the coefficient was 0.933. The calculated values of the Cronbach coefficient appear to be satisfactory (the coefficient higher than 0.7 is “satisfactory”) [6]. Individual dimensions were assessed by the respondents on the 6-point Likert scale.

In order to verify the clarity of the questionnaire, a pilot study was initially carried out. This pilot study was attended by a total of 20 students from the combined form of follow-up Master’s degree in Information Management. The final version of the questionnaire was created using “docs.google.com”. In total, 2,884 respondents were addressed. Approximately 250 of the e-mail addresses no longer existed, 25 respondents are not currently in business.

The obtained data was analysed using Microsoft Excel 2016 and IBM SPSS Statistics version 24 using descriptive statistics, parametric and non-parametric tests at confidence levels $\alpha = 0.01$ and $\alpha = 0.05$.

3 Results

In order to verify the questionnaire understands, a pilot study was carried out involving 20 students from the combined form of Master’s degree in Information Management at the Faculty of Informatics and Management in Hradec Králové. These respondents are employed in the following areas: software development, telecommunications, IT, electronics production, internet sale, sales, law, health, advertising, government, work with children, transport and logistics, sports, energy and heating. The data from the pilot study was evaluated using Microsoft Excel 2016 and the IBM SPSS Statistics version 24 statistical programme.

After evaluating the pilot survey, information on the organisation’s size and the position in the organisation was added to the questionnaire.

Table 2. Cronbach alpha for each dimension

Dimension	Cronbach α
D1: Creating opportunities for systematic learning	0.721
D2: Support for polling and dialogue	0.860
D3: Encourage team learning and collaboration	0.761
D4: Creating systems for capturing and sharing learning	0.683
D5: Motivating people for a collective vision	0.796
D6: System interfaces	0.765
D7: Strategic guidance for learning	0.791
Total	0.933

Source: own processing

Using the Cronbach alpha reliability indicator, the reliability of each dimension was determined. All dimensions except dimension 4 met the required reliability value, total reliability is relatively high ($\alpha = 0.933$). Although dimension 4 (Creating systems for

capturing and sharing learning) didn't reach 0.7 value, it's significantly close to this value (0.017 difference), so this value can also be considered satisfactory.

A total of 2,884 respondents from small and medium-sized companies from the Czech Republic with a focus on information technology activities were addressed. The study was attended by a total of 201 respondents (return on questionnaires was 6.97%). Organisations employing up to 10 employees (32.3%), up to 50 employees (45.3%) and 250 employees (22.4%) were represented in the study. General staff accounted for 35.8% of the respondents and managers accounted for 64.2% of the respondents. The respondents were made up of 137 men and 64 women. The largest age group were respondents aged 39 (6.0%), then 38 years (5.5%) and 47 years (5.0%). Regarding the distribution of respondents to age groups, the 31–40 years age group (37.8%) were represented most, followed by 57 respondents in the 41–50 years age group (28.4%) and 32 respondents in the 51–60 years age group (15.9%). In terms of education, respondents with a university education (72.1%) were represented most, followed by secondary school graduates (20.9%).

The respondents reported employment time in the organisation up to five years (32.8%), followed by 11–15 years (21.4%). Only two respondents worked in organisations for a longer time - one respondent for 31 years and the other for 36 years.

When comparing the evaluation of individual questions, one can say that none of the questions received less than half of the points. The respondents rated the worse questions 10 and 11: “My organisation creates systems to measure the difference between actual and expected performance” with an average rating of 3.386 and “My organisation makes all evaluations available to all employees” with an average rating of 3.236. The greatest indecision through the evaluation by respondents was expressed at question 20: “In my organisation, managers look for opportunities for further education.”, when they identified two values on the Likert scale from which the average was calculated.

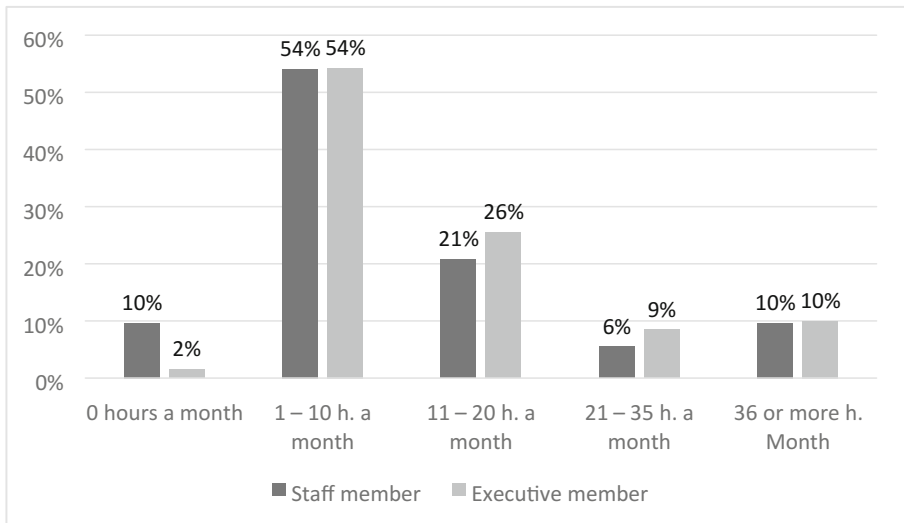


Fig. 1. Training time (per month) by worker's position (Source: own processing)

The majority of respondents devote from 1 to 10 h per-month to education that's related to employment. On average, employees spend 13 h on education. The relationship between the training time and job position is shown in Fig. 1.

Table 3. Comparison of respondents' responses with different intensity of education

	Average of D1	Average of D2	Average of D3	Average of D4	Average of D5	Average of D6	Average of D7
0 h a month	2.741	3.463	3.778	3.148	3.111	3.370	3.296
1–10 h a month	4.482	4.346	4.125	3.557	4.335	3.888	4.280
11–20 h a month	4.396	4.444	4.347	3.493	4.403	3.948	4.462
21–35 h a month	4.600	4.578	4.444	3.622	4.622	4.078	4.378
36 or more h Month	5.100	4.725	4.167	3.550	4.442	4.400	4.667

Source: own processing

The differences between managers and ordinary staff members are noticeable in the case where employees don't learn. The poorer attitude of ordinary staff members in regard to education could be justified by insufficient motivation for further education or by the fact that the organisation doesn't require further training. For dimensions 3, 4, and 5, the statement asserts that positive dimension ratings are growing up to 35 h per-month while investing more time in education per-month is slightly declining. The T-test reveals a statistically significant difference between people devoting "0 h" a month to education and the other groups of respondents who devote to education ("1–10 h" $p = 0.00028$; "11–20 h" $p = 0.00025$; "21–35 h" $p = 0.000092$; "more than 36 h" ($p = 0.00074$, $\alpha = 0.01$).

4 Discussion

The extension of the learning organisation concept in the Czech Republic hasn't been described yet. This paper is focused on evaluation of the learning organisation concept in Information Technology organisations registered in the Czech Republic.

Overall, nearly the study consisted of 70% men and approximately 30% women. This result was expected with respect to the field chosen for the study and is in-line with the reported male/female statistics in the IT sector [11].

When comparing the learning time of the ordinary staff members and managers, it's clear that managers learn more than regular staff. The managers' higher education is probably directly related to their higher assessment of the individual learning organisation dimensions (Fig. 1).

If we compare the learning time per-month with the average assessment of the individual dimensions, we find that there is a statistically significant difference ($p = 0.00074$) between non-learning staff and the employees who learn 36 or more hours per-month at the materiality level of $\alpha = 0.01$. At the same time, for dimensions 3, 4, and 5, positive dimensional ratings are growing up to 35 h per-month, while investing more time in education per-month slightly decreases (Table 3). If employees

were learning more than 36 h per-month, training could eventually take place at the expense of employment, which may have resulted in lower dimensions evaluation.

If we compare the average results of each dimension, we see that all dimensions correlate very closely with one another, which is consistent with Watkins, O’Neil [16].

Table 4 below shows an example of studies conducted abroad, along with an average rating score for each dimension. The total number of respondents in the comparative studies was $N = 2854$.

Table 4. Comparing DLOQ results with other studies

Study author	N	D1	D2	D3	D4	D5	D6	D7
Watkins and Marsick	389	3.94	3.91	3.98	3.50	3.74	4.00	4.13
Selden	142	5.01	4.05	4.09	3.44	3.83	4.17	4.49
McHargue	264	4.16	4.15	4.33	3.78	4.20	4.35	4.73
Lien, Yang, Li	79	3.97	4.05	4.00	4.13	4.08	4.01	4.26
Hernandez	906	3.94	4.16	4.01	4.09	4.21	3.96	4.27
Maria	628	4.05	4.08	3.84	3.96	3.79	3.98	4.21
			4.35	4.32	3.13	4.15	3.99	4.42
			4.09	4.01	3.86	3.99	4.04	4.29
Zubr			4.39	4.19	3.52	4.33	3.94	4.33
Ellinger	208	4.12	4.04	4.13	3.70	3.93	4.19	4.26
Milton. Watkins	37	4.26						
Weighted average			4.06	2.01	4.45			

Source: own processing by [16]

5 Conclusion

The aim of this study was to evaluate learning time in small and medium-sized organizations in the Czech Republic and to compare the learning time of general staff and managers in these organizations. To obtain the results we used the Dimensions of a Learning organization questionnaire according to other published studies. This questionnaire was distributed via e-mail between the general staff and managers of small and medium-sized organizations in IT sector in the Czech Republic. If we compare this study’s results with studies already conducted, we can say that the results obtained from organisations from the IT sector in the Czech Republic are satisfactory. The results obtained in 5 of 7 dimensions are higher than the weighted average of foreign studies that have been conducted. Compared to the weighted average of results, it can be concluded that organisations in the IT sector in the Czech Republic meet most of the learning organisation’s dimensions better than organisations in foreign studies. Higher ranking of organisations should give organisations a greater strategic advantage [16]. Organisations in the Czech Republic only have a lower average score in two dimensions. Specifically, Dimension 4 “Creating systems for learning and sharing learning” and Dimension 6 “System interfaces”. There was no statistically significant difference between the individual dimensions of the learning organisation concept ($p = 0.658$,

$\alpha = 0.05$) when comparing the average value from the comparative studies with the completed study in the Czech Republic. The training period per month has a positive impact on the evaluation of individual dimensions.

When assessing individual dimensions of the learning organisation, the differences between managers and ordinary staff members were observed. In the follow-up research, it would be appropriate to analyse several small and medium-sized organisations to look for a larger sample of management as well as ordinary staff members. At the same time, it would be useful to mutually compare DLOQ results across the various fields of action.

Acknowledgement. The paper was written with the support of the specific project 6/2018 grant “Determinants of Cognitive Processes Impacting the Work Performance” granted by the University of Hradec Králové, Czech Republic and thanks to help of students Majid Ziaei Nafchi.

References

1. Adamec, J.: Základní principy koncepce učící se organizace a jejich přijímání (2010). <http://emi.mvso.cz/EMI/2010-02/07%20Adamec/Adamec.pdf>
2. Albertina for business and marketing (2018). http://www.albertina.cz/?gclid=Cj0KCQiAzrTUBRCnARIsAL0mqcz2seJjxmISfi7QlvHHAwN-ZnZrWpd4Botnujmtq08Zio1vx0BfBMaAu-bEALw_wcB
3. BusinessDictionary.com: Learning organization (2015). <http://www.businessdictionary.com/definition/learning-organization.html>
4. Czech Statistical Office: Malé a střední podniky (jejich místo a role v české ekonomice) (2005). <https://www.czso.cz/csu/czso/cri/male-a-stredni-podniky-jejich-misto-a-role-vceske-ekonomice-2005-rhybfgzbj0>
5. Czech Statistical Office: Malé a střední firmy v ekonomice ČR v letech 2003–2010 (2013). <https://www.czso.cz/documents/10180/20534676/116111a.pdf/9c378e0f-d77a-4f21bf3e-e4ed35cb1122?version=1.0>
6. Institute for Digital Research and Education: What does Cronbach’s alfa mean? (2017). <https://stats.idre.ucla.edu/spss/faq/what-does-cronbachs-alpha-mean/>
7. Jamali, D., Sidani, Y., Zouein, C.: The learning organisation: tracking progress in a developing country. A comparative analysis using the DLOQ. *Learn. Organ.* **16**, 103–121 (2009). <https://doi.org/10.1108/09696470910939198>
8. Marquardt, M.J.: *Building the Learning Organisation*. Davies-Black Publishing, Palo Alto (2002)
9. Marsick, V.J., Watkins, K.E.: Demonstrating the value of an organisation’s learning culture: the dimensions of the learning organisation questionnaire. *Adv. Dev. Hum. Resour.* **5**, 132–151 (2003). <https://doi.org/10.1177/1523422303251341>
10. NACE: 62.0 Činnosti v oblasti informačních technologií (2018). <http://www.nace.cz/nace/62-0-cinnosti-v-oblasti-informacnich-technologii/>
11. National centre for women and information technology (2018). <https://www.ncwit.org/>
12. Norashikin, H., Safiah, O., Fauziah, N., Noormala, A.: Learning organisation culture, organisational performance and organisational innovativeness in a public institution of higher education in malaysia: a preliminary study. *Procedia Econ. Financ.* **37**, 512–519 (2016). [https://doi.org/10.1016/S2212-5671\(16\)30159-9](https://doi.org/10.1016/S2212-5671(16)30159-9)

13. Qawasmeh, F., Al-Omari, Z.: The learning organisation dimensions and their impact on organisational performance: orange jordan as a case study. *Arab Econ. Bus. J.* **8**, 38–52 (2013). <https://doi.org/10.1016/j.aebj.2013.11.005>
14. Senge, P.: *The Fifth Discipline: The Art & Practice of Learning Organization*. Doubleday, New York (2006)
15. Watkins, K.E., Marsick, V.J.: *Sculpting the Learning Organisation: Lessons in the Art and Science of Systematic Change*. Jossey-Bass, San Francisco (1993)
16. Watkins, K.E., O’Neil, J.: The dimensions of the learning organisation questionnaire (the DLOQ): a nontechnical manual. *Adv. Dev. Hum. Resour.* **15**, 133–147 (2013). <https://doi.org/10.1177/1523422313475854>
17. Yadav, S., Agarwal, V.: Benefits and barriers of learning organisation and its five discipline. *IOSR - JBM* **18**, 18–24 (2016). <https://doi.org/10.9790/487X-1812011824>
18. Zubr, V.: E-learning as part of a learning organisation. In: *Double-Blind Peer-Reviewed Proceedings of the International Scientific Conference Hradec Economic Days 2016 1240-1246*. University of Hradec Kralove, Hradec Kralove (2016)
19. Zubr, V., Mohelska, H., Sokolova, M.: Factors with positive and negative impact on learning organisation. In: *Double-Blind Peer-Reviewed Proceedings of the International Scientific Conference Hradec Economic Days 2017 980-985*. University of Hradec Kralove, Hradec Kralove (2017)