

KNOWLEDGE MANAGEMENT PROCESS AND TEACHER LITERACY SKILLS AT STATE VOCATIONAL HIGH SCHOOLS IN WEST JAVA: MEDIATING EFFECT OF KNOWLEDGE SHARING

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Abstrack

This purpose of this study is to analyze the effect of knowledge management process on teacher literacy skills at State Vocational High Schools in West Java mediated by knowledge sharing. To collect data, the questionnaire was used. This research uses a quantitative approach, through descriptive and verification research. Based on the characteristics of the variables, this study was conducted by a survey (7 rating scale). This research was administered to 162 teachers from 54 VHS at 27 cities/regencies in West Java. The Partial Least Square Structural Path-Modeling (PLS-PM) was used to test the hypotheses. The research outcomes revealed that the effect of knowledge management on teacher literacy skills mediated by knowledge sharing is significant. Teacher must pay more attention to the information literacy.

Keywords: Knowledge Management Process; Knowledge Sharing; Mediating Effect; Teacher Literacy Skills; Vocational High Schools

INTRODUCTION

Education and human resources are the most important determinants of national development in this globalization and digital era (Blanchard & Olney, 2017). Education is increasingly expected to promote standardized development goals and economic competitiveness in the global arena (Buckner, 2017). All countries in this globalization continue to develop education because educational institutions, from basic education to higher education, have a very important role as agents of change and transformation toward better development in a country, including in Indonesia.

At school, the teacher plays an important role in planning, implementing, and evaluating the learning process. An effective learning process can enhance and produce graduates to respond to global challenges (Trilling & Fadel, 2009). The creativity, capacity, competence, innovation, and attitude of professional teachers are needed to make this happen. The learning process is not enough just to master knowledge competence alone; other competencies are also very necessary

for the creation of an effective learning process. That is, the learning process must take place in a combination of knowledge about the subject matter and knowledge to deliver the material properly and appropriately in line with pedagogical knowledge and supported by suitable learning media and technology (Scheiner, 2019).

The development of information and telecommunications technology (ICT) in the 21st century is driving change in all sectors, including the education sector. In education and learning, digital ICT simultaneously demands, reflects, and builds the skills and knowledge of teachers in various learning processes, both using old and new learning methods (Griffin & Care, 2014). Teachers need to master the integration of knowledge and skills related to the content, pedagogy, and technology to be able to transfer them to students. There are 12 skills that students need to master in the information age, which is called "21st-century skills", including information literacy, media literacy, and technology literacy, which must go hand in hand with other skills (learning skills and life skills) (Voogt & Roblin, 2010). To teach these skills to students, the teacher must first have knowledge of these skills. Literacy skills (information, media, and technology) require teachers to realize the importance of knowledge sharing and knowledge management process.

The emergence of knowledge management (KM) as a practical discipline is related to the fact that knowledge is an important source for organizations to develop and maintain sustainable competitive advantage (Easa, 2012). The idea of knowledge management has attracted many researchers and has been studied theoretically and practically (Bose, 2002). The importance of this knowledge has encouraged organizations to pay more attention to how to manage the knowledge effectively (Choi, 2008). Knowledge can be organizational or personal (Fuller & Unwin, 2004). Organizational knowledge is *the capacity members of an organization that have been developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings*, meanwhile the personal knowledge is *the individual capacity to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both* (Dulipovici & Baskerville, 2007).

In organizations, knowledge can also be internal or external (Frenz & Ietto-Gillies, 2009). Internal knowledge is obtained from internal sources such as employees, the R&D department, the sales department, and the production department. External knowledge is obtained from external institutions such as experts, customers, suppliers, and other organizations/institutions. With various types of knowledge, all of these types are rooted and reside in the human mind, both tacit and explicit. Tacit knowledge is defined as *"personal, context-specific, and therefore hard to formalize and communicate"*, while explicit knowledge is *"knowledge that is transmittable in formal, systematic language"* (Nonaka & Takeuchi, 1995). Concerning the characteristics of tacit and explicit knowledge, the two forms of knowledge can be considered separate and distinct.

The scope of knowledge management (KM) is not something that can be generally accepted. KM is defined as *"the coordination and exploitation of organizational knowledge resources, in order to create benefit and competitive advantage"* (Drucker, 2007). Nevertheless, the scope of knowledge management can be limited to lessons learned and techniques used to manage things that are already known. Furthermore, KM is defined as *"managing the corporation's knowledge through a systematically and organizationally specified process for acquiring, organizing, sustaining, applying, sharing and renewing both the tacit and explicit knowledge of employees to enhance organizational performance and create value"* (Davenport & Prusak, 1998).

Measurement and dimensions of knowledge management refer to the model in an organizational context: acquisition of knowledge, storage of knowledge, distribution of knowledge, and use of knowledge (Gonzalez & Martins, 2017). In the study of secondary

education, in addition to being an element of forming a sustainable competitive advantage, knowledge is also a value for these educational institutions, so that the perspective of knowledge in educational institutions implies the exploration of knowledge internally and externally both as a resource and as an output from the process of developing knowledge management that is carried out by the school, with the teacher as the main agent. By using knowledge management, teachers are encouraged to become human capital, so that the recognition of the quality of a teacher is not only based on seniority but on the extent to which the teacher is part of the use of knowledge management in schools.

Today, organizations are increasingly aware of the importance of knowledge sharing (KS) among members of the organization. Employees and managers also seek, test, and use various proactive interventions to facilitate this knowledge sharing. Knowledge sharing is supported by a variety of different objectives: acquire knowledge, reuse knowledge, and develop new knowledge (Zimmerman, 2008). Advances in information and communication technology (ICT) have enabled support to achieve these goals. Based on the theory, knowledge sharing can lead to real benefits in certain situations. This success certainly depends on many factors, such as additional advantages for an individual in sharing knowledge with other individuals, collective involvement in organizations, and the accuracy of the application of ICT. In the end, the important factor in the success of knowledge sharing is the level of application in daily operations in an organization. If this knowledge sharing process can be institutionalized, then all those involved in the organization are assumed to have made knowledge sharing an important part of their daily work routines. Knowledge sharing (KS) is the most important part of knowledge management (KM) (Hasanali, 2007). In this case, “managing and sharing knowledge” cannot be separated. KM would be meaningless without KS. Knowledge sharing in KM is also influenced by various factors: (a) leadership, (b) culture, (c) structure, roles and responsibilities, (d) information technology infrastructure, and (e) measurement.

Knowledge sharing creates opportunities to maximize an organization's ability to meet those needs and produce solutions and efficiencies that provide competitive advantages for businesses (Reid, 2003). Knowledge sharing can be defined as “a social interaction culture, involving the exchange of employee knowledge, experiences, and skills through the whole department or organization” (Lin, 2007). In other words, KS is a culture of social interaction, which involves the exchange of employees’ knowledge, experience, and skills through an entire department or organization. As previously stated, KS is closely related to the application of KM. The link between knowledge management and knowledge sharing is that “*While traditional knowledge management emphasis was placed on technology or the ability to build systems that efficiently process and leverage knowledge, the new model of knowledge management involves people and actions. It aims at creating an environment where power equals sharing knowledge rather than keeping it*” (Al-Alawi et al, 2007).

Thus, KS is not just technology, but rather is a new KM model that involves humans and action. Knowledge sharing consists of some understandings related to giving employees access to relevant information so that employees can then build and use knowledge networks within the organization (Hoegl, 2003). More than that, knowledge sharing arises at the individual and organizational levels. For individual employees, knowledge sharing can be in the form of speaking to coworkers to help so that something can be done better, faster, and efficiently. For knowledge sharing organizations related to the efforts of “capturing, organizing, reusing, and transferring” experience-based knowledge that is in the organization and making that knowledge available to other parties. Some previous studies have shown the importance of knowledge sharing because it allows organizations to improve their innovation capabilities and business performance while

reducing redundant learning efforts (Calantone, 2002).

The first indicator to measure knowledge sharing is assessment, namely assessment and direct perception of members of the organization related to the level of implementation of KS in the organization, whether it is excellent, good, or poor. Another indicator of knowledge sharing is teamwork or collaboration in carrying out routine tasks (Goh, 2002). Finally, the willingness is one of the indicators of KS with colleagues or other parties outside the organization. The development of students in mastering the skills of the 21st century is certainly inseparable from the role of educators in understanding the various skills and the use of digital technology associated with it. By understanding 21st-century skills and utilizing digital technology in learning, educators can implement these demands for the benefit of future students. This research focuses on teacher literacy skills of information, media, and technology influenced by knowledge management and knowledge sharing at 54 State Vocational High Schools (VHS) in West Java.

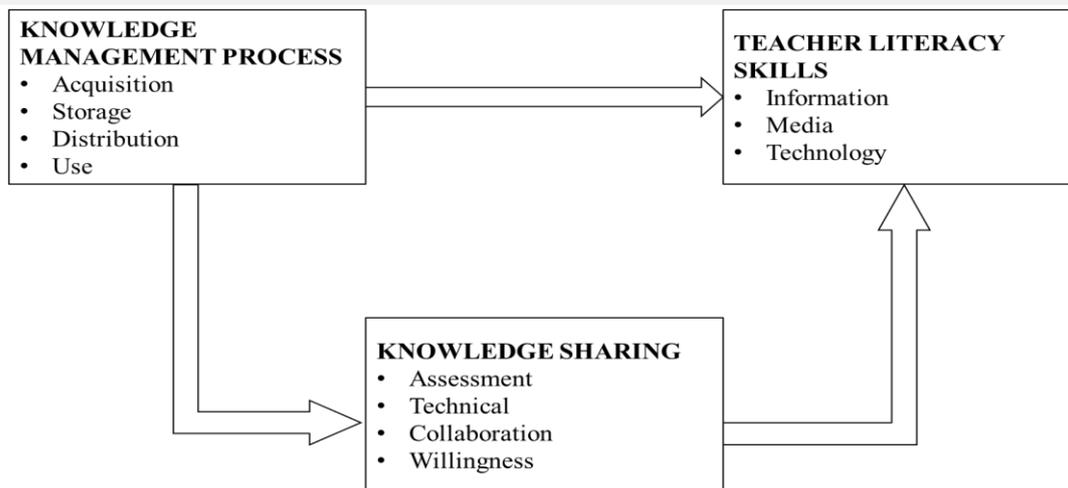
METHOD RESEARCH

This research uses a quantitative approach, through descriptive and verification research. Based on the characteristics of the variables, this study was conducted by a survey (7 rating scale). This research was administered to 162 teachers from 54 VHS at 27 cities/regencies in West Java. The operationalization of these variables can be explained as follows.

1. Knowledge Management Process (KMP) is an exogenous latent variable, measured by acquisition, storage, distribution, and use of knowledge.
2. Knowledge Sharing (KS) is an endogenous latent variable and also mediating variable, measured by assessment, technical, collaboration, and willingness.
3. Teacher Literacy Skills is an endogenous latent variable, measured by literacy skills on information, media, and technology.

The analysis in this study consisted of descriptive analysis and Partial Least Square Path Modeling (PLS-PM) analysis. Descriptive analysis is a statistic used to analyze data by describing the data that has been collected as it is without intending to make generally accepted conclusions or generalizations. Descriptive statistics used are the average achievement values (mean) of each indicator, dimension, and variable, the value of which can be grouped in certain categories. The determination of this category is based on a comparison of the maximum ideal average score minus the ideal average score, so that values can be divided into 4 (four) quartiles (Low, Fairly Low, Fairly High, High). The research model is presented in Figure 1.

Figure.1 Research Model



To test the hypothesis, PLS analysis is used which includes measurement models and structural models. The measurement model analyzes the relationship between a construct and indicators/dimensions (also called manifest variables). Calculations from this measurement model include:

1. Construct reliability uses Dijkstra-Henseler's rho (ρ_A), composite reliability (ρ_C), and Cronbach's alpha (α).
2. Convergent reliability uses the measurement of Average Variance Extracted (AVE).
3. Discriminant validity using the Fornell-Larcker criterion and the Heterotrait-monotrait ratio of correlations (HTMT).
4. Measurement indicators use factor loadings and cross-loadings.

The structural model deals with estimating the relationship between one latent variable and one or several other variables. The determination of structural models usually includes the following calculations.

1. Inter-construct correlations
2. coefficient of determination (R^2)
3. Path coefficients, Indirect effects, and total effects
4. Effect size (Cohen's f^2)

RESULTS AND DISCUSSION

Descriptive analysis shows average performance scores, standard deviations, and categories. Descriptive analysis results for each construct can be presented in Table 1.

Table 1. Descriptive Analysis

Indicators	Mean	Std. Dev.	Category
Acquisition	5.12	1.02	Fairly High
Storage	5.22	1.17	Fairly High
Distribution	5.14	0.92	Fairly High
Use	4.13	1.13	Fairly High
Knowledge Management Process (KMP)	4.91	1.15	Fairly High
Assessment	5.26	1.16	Fairly High
Technical	5.30	1.00	Fairly High
Collaboration	5.29	1.01	Fairly High

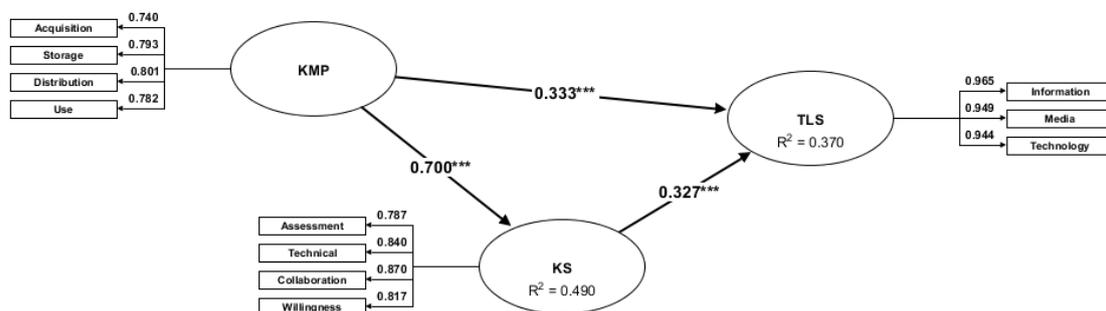
Willingness	5.54	1.00	High
Knowledge Sharing (KS)	5.35	1.00	Fairly High
Information Literacy	3.98	1.16	Fairly Low
Media Literacy	4.24	1.00	Fairly High
Technology Literacy	4.16	1.01	Fairly High
Teacher Literacy Skills (TLC)	4.13	1.06	Fairly High
Teacher Literacy Skills (TLC)	4.13	1.06	Fairly High

Based on Table 1, the Knowledge Management Process (KMP) of the teachers is in a fairly high category (with mean = 4.91 from ideal 7,00). It implies that teachers have adequate knowledge related to the acquisition, storage, distribution, and use. In this sense, the indicator of storage is the highest compared to other indicators in this construct (mean = 5.22 from ideal 7,00). Nevertheless, the standard deviation is also high which means there is high variability in storing knowledge among the teachers. The use of knowledge is the lowest compared to other indicators, which means several teachers are still experiencing some specific difficulties in using knowledge adequately.

Knowledge Sharing (KS) of the teachers is also in fairly high category (mean = 5.35). It indicates that the teachers have also adequate levels of assessment, technical, collaboration, and willingness to share knowledge with their colleagues and the students. The willingness to share knowledge is the highest, while the assessment of knowledge sharing is the lowest among those indicators. Teacher Literacy Skills (TLC) is in a fairly high category (mean = 4.13). Media literacy is the highest indicator of these teacher literacy skills, followed by technology literacy. However, the information literacy of the teacher is the lowest indicator with the largest variability. This condition shows that teachers often get lost in the flow of unimportant and useless information.

To test the hypothesis, PLS analysis is used, through the measurement model and the structural model. PLS calculations in this study use the ADANCO program version 2.1.1. The overall model in this study is presented in Figure 2.

Figure 2. Overall Model



Construct reliability, convergent reliability, discriminant validity, and factor loadings are used to calculate the measurement model. Calculation of construct reliability using Dijkstra-Henseler's rho (ρ_A), composite reliability (ρ_C), and Cronbach's alpha (α) can be presented in Table 2. The table shows that all constructs have a value of > 0.7 so that the constructs of Knowledge Management Process, Knowledge Sharing, and Teacher Literacy Skills are reliable and support a good model.

Table 2. Construct Reliability

Construct	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_C)	Cronbach's alpha(α)
KMP	0.787	0.861	0.784

KS	0.852	0.898	0.848
TLS	0.950	0.967	0.949

Convergent reliability calculation uses the measurement of Average Variance Extracted (AVE) which is usually interpreted as a measure of unidimensionality. Reflective constructs show good unidimensionality if the AVE value is more than 0.5 (Fornell & Larcker, 1981). The results of convergent reliability calculations using AVE can be presented in Table 3. The calculation results show that the AVE value for each construct is more than 0.5 so that it can be stated that all constructs have good unidimensionality.

Table 3. Convergent Reliability

Construct	Average variance extracted (AVE)
KMP	0.607
KS	0.687
TLS	0.908

Fornell-Larcker criterion states that AVE of a construct should be higher than the value of squared correlations with other constructs in the model. The heterotrait-monotrait ratio of correlations (HTMT) measures the discriminant validity of all factors. HTMT values should be lower than 0.9 or 0.85. The results of discriminant validity calculations using the Fornell-Larcker criterion and HTMT can be presented in Table 4.

Table 4. Discriminant Validity

Discriminant Validity: Heterotrait-Monotrait Ratio of Correlations (HTMT)

Construct	KMP	KS	TLS
KMP			
KS	0.848		
TLS	0.648	0.621	

Discriminant Validity: Fornell-Larcker Criterion

Construct	KMP	KS	TLS
KMP	0.607		
KS	0.490	0.687	
TLS	0.315	0.313	0.908

Squared correlations; AVE in the diagonal.

The calculation results show that the HTMT value is below 0.9 and in the Fornell-Larcker Criterion, it can be seen that the AVE value (which is marked in bold) is higher than the value of each of its square correlation. This discriminant validity shows that each construct studied does have different characteristics in the concept. In other words, a construct has a different concept from another construct. Factor loadings are slopes of a simple regression of an indicator with its construct. The loading matrix factor can be presented in Table 5.

Table 5. Discriminant Validity

Indicator	KMP	KS	TLS
Acquisition	0.740		
Storage	0.793		
Distribution	0.801		
Use	0.782		
Assessment		0.787	
Technical		0.840	
Collaboration		0.870	
Willingness		0.817	

Information			0.965
Media			0.949
Technology			0.944

The results of the factor loadings calculation show that each indicator (dimension or manifest variable) is valid and reliable able to reflect each construct, and is able to show conceptual (and statistically) differences between each indicator in one construct with other indicators in the other construct. Basically, all indicators and all constructs lead to a good model as a basis for hypothesis testing, as analyzed in the structural model.

The structural model is basically related to the estimation of the relationship between one construct and one or several other constructs. Inter-construct correlation is a correlation matrix that shows the closeness of the relationship between one construct and another construct. Basically, this matrix shows a close relationship (between 0.6 and 0.8) between these constructs (see Table 6).

Table 6. Inter-construct Correlation

Construct	KMP	KS	TLS
KMP	1.000		
KS	0.700	1.000	
TLS	0.561	0.560	1.000

The coefficient of determination (R^2) basically measures the proportion of variance of an endogenous variable that can be explained by independent variables. Based on these results, it can be stated that the variance in the construct of Knowledge Sharing can be explained by the Knowledge Management Process of 42.4%, and that Teacher Literacy Skills can be explained by Knowledge Management Process and Knowledge Sharing of 37,0%.

Table 7. Coefficient of Determination (R^2)

Construct	Coefficient of determination (R^2)	Adjusted R^2
KS	0.490	0.487
TLS	0.370	0.362

Path coefficients are standardized regression coefficients (beta values). This path coefficient measures the direct effect of an independent variable on a dependent variable. This path coefficient can be interpreted as an increase in the dependent variable if the independent variable rises to one standard deviation and all other independent variables in the equation remain constant.

Table 8. Effect Overview

Effect	Beta	Indirect effects	Total effect	p-value	Cohen's f^2
KMP → KS	0.700		0.700	0.000	0.960
KMP → TLS	0.333	0.229	0.561	0.000	0.089
KS → TLS	0.327		0.327	0.000	0.086

Based on the results of bootstrapping, it was found that each path of the exogenous to the endogenous variable has a p-value below 0.05 which indicates that all paths are significant so that all hypotheses are accepted. The hypotheses testing shows that KMP has a significant effect on KS, KMP has a significant effect on TLS, and KS has a significant effect on TLS. In this model, KS functions as a mediating variable for KMP and TLS. This study confirms the findings of (Davenport & Prusak, 1998,; Hoegl, 2003,; Calantone, 2002, & Goh, 2002) related to the importance of knowledge management in increasing knowledge sharing and in turn developing teacher literacy skills.

CONCLUSION

This research reveals the effect of knowledge management on teacher literacy skills mediated by knowledge sharing at Vocational High Schools in West Java. The effect of each exogenous on the endogenous variable is significant. Knowledge sharing may function as a mediating variable for the knowledge management process and teacher literacy skills. Literacy is important for building literacy skills, but achievement is relatively low. The teacher needs to make some efforts to align these skills with more appropriate directions. With a more precise direction of literacy skills, it is expected that teacher literacy skills in the learning process can be more effective.

REFERENCES

- Al-Alawi, A. I., Al-Marzooqi, N. Y., & Mohammed, Y. F. (2007). Organizational culture and knowledge sharing: Critical success factors. *Journal of Knowledge Management*, 11(2), 22–42.
- Blanchard, E. J., & Olney, W. W. (2017). Globalization and human capital investment: Export composition drives educational attainment. *Journal of International Economics*, 106, 165–183.
- Bose, R. (2002). Knowledge management capabilities & infrastructure for E-commerce. *Journal of Computer Information Systems*, 42(5 SPEC. ISS.), 40–49.
- Buckner, E. S. (2017). The changing discourse on higher education and the nation-state, 1960–2010. *Higher Education*, 74(3), 473–489.
- Calantone, R. J., Tamer, C. S., & Yushman, Z. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31(6), 515–524.
- Choi, B., Poon, S. K., & Davis, J. G. (2008). Effects of knowledge management strategy on organizational performance: A complementarity theory-based approach. *Omega*, 36(2), 235–251.
- Davenport, T. H., & Prusak, L. (1998). *Working Knowledge: How Organizations Manage what They Know*. Harvard Business Press.
- Drucker, P. F. (2007). *Management Challenges for the 21st Century*. Routledge.
- Dulipovici, A., & Baskerville, R. (2007). Conflicts between privacy and property: The discourse in personal and organizational knowledge. *Journal of Strategic Information Systems*, 16(2), 187–213.
- Easa, N. F. H. (2012). *Knowledge Management and The SECI Model: A Study of Innovation in The Egyptian Banking Sector*. Stirling Management School.
- Fornell, C., & Larcker, D. F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. *Journal of Marketing Research*, 18(3), 382.
- Frenz, M., & Ietto-Gillies, G. (2009). The impact on innovation performance of different sources of knowledge: Evidence from the UK Community Innovation Survey. *Research Policy*, 38(7), 1125–1135.
- Fuller, A., & Unwin, L. (2004). Expansive learning environments: integrating organizational and personal development. In H. Rainbird, A. Fuller, & A. Munro (Eds.), *Workplace learning in*

- context* (pp. 126–144). Routledge.
- Goh, S. C. (2002). Managing effective knowledge transfer: An integrative framework and some practice implications. *Journal of Knowledge Management*, 6(1), 23–30.
- Gonzalez, R. V. D., & Martins, M. F. (2017). Knowledge management process: A theoretical-conceptual research. *Gestao e Producao*, 24(2), 248–265.
- Griffin, P., & Care, E. (Eds.). (2014). *Assessment and teaching of 21st century skills: Methods and approach*. Springer.
- Hasanali, F. (2007). Critical success factors of knowledge management. In M. E. D. Koenig, T. K. Srikantaiah, & T. Srikantaiah (Eds.), *Knowledge Management Lessons Learned: What Works and what Doesn't*. Information Today, Inc.
- Hoegl, M., Parboteeah, K. P., & Munson, C. L. (2003). Team-Level Antecedents of Individuals' Knowledge Networks. *Decision Sciences*, 34(4), 741–770.
- Lin, H. F. (2007). Knowledge sharing and firm innovation capability: An empirical study. *International Journal of Manpower*, 28(3–4), 315–332.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press.
- Reid, F. (2003). Creating a knowledge-sharing culture among diverse business units. *Employment Relations Today*, 30(3), 43–49.
- Scheiner, T., Montes, M. A., Godino, J. D., Carrillo, J., & Pino-Fan, L. R. (2019). *What Makes Mathematics Teacher Knowledge Specialized? Offering Alternative Views*. *International Journal of Science and Mathematics Education*, 17(1), 153–172.
- Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley & Sons.
- Voogt, J., & Roblin, N. P. (2010). *21st century skills*. Joke Voogt & Natalie Pareja Roblin.
- Zimmerman, A. S. (2008). Sharing and Reuse of Ecological Data. *Science, Technology, & Human Values Human Values*, 33(5), 631–652.