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**SCHOOL PORTALS: AN OPPORTUNITY FOR  
COLLABORATIVE BLENDED LEARNING**

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**Abstract**

Covid-19 crisis in Israel drove many schools to rapidly respond to the risk of contamination by quickly moving to teaching from home with technological means. Not the pupils nor the teachers were prepared for such a fast change. School portals, existing in almost every school in Israel, found to be non-active let alone becoming a pedagogical platform for continuing the regular and web-based instruction. The current research attempts to suggest aspects of blended learning, engagement and feeling of success by the pupils, operated in the old school portals, as an educational strategy to elevate pupils' achievements. Utilizing school portals as a platform for collaborative self-regulated learning in small groups dealing with authentic assignments. The strategy of motivating the pupils made use of Google Drive utilities such as document sharing and site building to advance the process of learning. Twenty school portals from all over the country selected randomly were examined for the ministry of education list of criteria. Most of them were found unfunctional or at most utilizing only managemental tools. The rest of the requirements were not performed in most portals. A case study exploring the utilization of school portal's feature in authentic assignment was conducted with two fourth-grade classes. Interviews of 2 groups provided a picture of the satisfaction and the good process that the pupils went through in this kind of instruction.

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## 1. Introduction

The Covid-19 crisis all over the world including Israel, "caught" many schools unprepared for learning from distance. Teachers moved to teaching from home with video connection applications such as "Zoom" or similar applications. Exploring some comments in social networks, demonstrates educator's dilemmas about how to imply conventional instruction with technological means, from distance. In fact, teachers were "thrown into" a process of adapting themselves to an ongoing learning process of teaching with technology from home. Many schools searched for a proper platform in which they can systematically conduct distant instruction, which serves as a good learning supplementing the regular class.

## 2. Literature Review

### 2.1. Distant learning

A study describing a pedagogical offering between U.S.-based business teams and U.K.-based engineering teams, was done in 2015 between researchers from Milwaukee and Glasgow. That research attempted to deliver such an experience around mutually dependent, socially responsible projects. The researchers maintained that higher education had gave only few opportunities for remote teams to learn from collaborative work. Surveys and reflections done for this research confirm that the pedagogical design can generate perceived interdependence between diverse student teams. Student responses to surveys suggest that collaborative learning is effective in raising students' level of performance within interdisciplinary and remote teamwork. The study concludes with recommendations for transferability and actualization of interdisciplinary collaboration (Adya et al., 2015).

According to several researchers, among them Barki and Pinsonneault (2005), Arnold (2000), remote multidisciplinary team learning and working, is essential for today's workplace. Several other researchers claimed that teamwork should not only support trust, productive relationships and effective communications, it also has to comprehend and make pedagogical use of the synergies deriving in this kind of teamwork through technology mediation (Long & Carlo, 2013; Temple & Allan, 2000).

Rosenfield (1992) depicts multidisciplinary teamwork as independent in its own disciplines aiming to solve a common problem and contrasts those problems with interdisciplinary teams that work jointly, but from their own perspectives, to address this shared issue.

Adya et al. (2015) quoting other researches maintain that virtual teams have been researched extensively (e.g., Powell et al., 2004). According to them, few studies have examined virtual teams pedagogically. "Socially responsible projects are effective in creating awareness in students about their role as global citizens" (Adya et al., 2015, p. 7). Such projects may be more engaging than traditional academic activities, as they contain authentic real-world constraints. They found a relatively small number of collaborative projects centered on social responsibility. One of them was Metros (2005) that developed learning objects for school students.

## **2.2. Blended learning**

Williams and Chinn (2009) claimed that online assignments using sharing technologies upgraded pupil engagement and increased the level of their connectivity. When pupils actively share ideas and engage themselves in discussions using information & communication technologies (ICT), they benefit from each other. A higher degree of pupil involvement can improve the asynchronous learning of the student (Stefanou & Salisbury-Glennon, 2002). According to Lord and Lomicka (2008), online discussions can facilitate the co-construction of knowledge and the pupil's participation.

Asynchronous online discussions may serve as a tactical resource to help pupils escape some of the in-class frustrations and help them when they are outside of school to supplement their frontal meetings in a blended instructional approach. This blend of classroom and online learning modes come to elevate the pupils' experience having that individuals are, typically, not a single method learner (Masie, 2002).

Halverson and Graham (2019) in their meta-analysis of researches concerning blended learning and learning engagement maintain that learner engagement associates with essential educational results. It means, academic achievements and satisfaction. Blended learning contains the combination of face-to-face and technology-mediated instruction (Graham, 2013). Sometimes however, consider is as a higher-level idea that is frequently defined in terms of its surface features (online and face-to-face) it must be considered for its pedagogical features (Graham et al., 2014).

## **2.3. Learners' Engagement**

According to Schunk and Mullen (2012), learners' engagement depicts the involvement of the student's emotional and cognitive energy to fulfill positively a learning task. Halverson and Graham (2019), listing many other researchers, mention other benefits related to learner engagement such as persistence, and sense of community. In contrary, students that are not engaged in their own education, perform low interest, motivation, and academic outcomes. Personal and contextual facilitators of engagement such as teachers using technology promoting collaboration and group assignments, including thoughtful learning experience design, can increase the likelihood of learners' engagement (Halverson & Graham 2019).

## **2.4. Authentic Assignment**

Steiner (2016) maintains that college students admit to first year unprepared for the first year of academic studies. She mentions several reasons among them fast content learning in high school that do not fit academic requirements. She states that success in college requires the development of self-regulated learning strategies that move beyond high school skills. Furthermore, she claims that first-year students of all ability levels may benefit when taught how to use academic learning strategies in an authentic context. According to Steiner (2016), authentic assignment addresses the problem of implementation of required searched knowledge on a real or imaginary posted situation. It demands merger of knowledge, information, "crowd-wisdom" and self-regulated learning attitude to unify a full answer to given task. In the Strategy Project assignment, pupils may learn to manage time, to communicate, and make use of strategies for assimilation and implementation of the knowledge acquired. By giving feedback on reflective thinking and

goal-directed interaction with class-mates strategies that contribute to success in learning, instructors can model the process of self-regulation.

## **2.5. School portal as perceived by the Israeli Ministry of Education**

The Israeli Ministry of Education's website elaborates on web-based education in its main webpage: ([https://sites.education.gov.il/cloud/home/beit\\_sefer\\_metukshav/Pages/meafiency\\_portal.aspx](https://sites.education.gov.il/cloud/home/beit_sefer_metukshav/Pages/meafiency_portal.aspx)).

In this page, which is enrolled with school portal's characteristics, there is a list of the national objectives of school portal. The list begins with this statement:

"The school's portal is the main component in a school that implies digital meaningful learning and web-based learning adapted to technology and the pedagogy of the 21st century."

Hereby the main characteristics expressing the potential incorporated in the school portal:

- **Web-based learning environment** – Without dependency on time and space – the school portal exists as a platform for web-based learning that enables performance of active learning continuity. It commences in the web-based class and continues at home. The information about the learning subjects, assignments and homework are transferred by the mean of RSS in a perpetual manner from the pedagogical management tool to the web-based class spaces (class websites).

- **Transparency and visibility** – the school portals are, in fact, a "virtual show window" that reviles the application of web-based education to the community. School projects, initiatives and actual doings for the parents and the community to watch. The parents have the possibility to follow their children's homework and assignments, Special events and information for the parents. A student that was absent from studies, can be updated with the learning material and homework online as well as class notifications. The transparency and visibility are done with rigor safety of the students and staff's privacy.

- **Adaptation to digital generation** – The activation of students in the virtual space with tools, and with correlation to the technological language they speak such as: communication, daily notifications, learning activities, virtual learning frameworks and so on...

- **Management and organization of educational knowledge** – Learning materials and activities are organized in the school's portal according to knowledge arias and age groups. Along sides with that there are links to learning websites, content providers and the ministry of education's educational content portal. The material and the contents of the portal are characterized with various digital media including links, text, images, clips, presentations, applications, etc.

- **Development of self-regulated learner** – The portal as a gate to learning opens many flexible possibilities for self-regulated learning and supports self-regulation. It does it with the means of search engines and data resources, entrance to educational content providers, forums and discussion groups etc. The learner converts from a customer of knowledge to a creator of knowledge, that publish personal product, through contribution to collaborative learning.

- **Collaborative learning** – is done with blogs, forums, social networks and discussion groups. This kind of learning leads to creation of shared multi-discussion in the class environment around the learning subjects. The portal's environment invites a formation of group product such as presentation, clip, portfolio, news reports etc.

• **Emergency time learning environment** – school portal is being used in activating the school in time of emergency. The portal provides a supplement for learning in the class, it evokes social and occupational framework for the pupils and provides a relevant answer to fears and hardships caused by the emergency time. (One must remember that in Israel there are many areas suffering from bombing and missile attacks, causing many schools to close at this time to prevent dangerous public gathering).

• **Organizational Communication** – The portal becomes a communication and information channel between the school staff, the students and their parents. A formation of organizational communicational culture through the school portal is done by forums and notifications to the staff, virtual bulletin board and virtual diary.

• **School Virtual Community** – findings demonstrate that activity around the school portal, strengthens the community activation, the mutual involvement and the cooperation between all factors: Teachers, students, school principals and such. For example, it is possible to see that the school's vision appearing in the portal was co-constructed with pupils, teachers, parents and other members of the community.

• **Green environment** – The portal is a virtual environment enabling saving raw materials in the various coasts as well as consumption and influence on the environment. For example: The portal saves papers and provides publicity without the need to send printed material in the old kind of technology.

### 3. Research Method

#### 3.1. Purpose of study

The purpose of this study is to inquire how school portal can be used as a pedagogical surface for blended collaborative learning.

#### 3.2. Research Questions

- 1) Does the current situation of Israeli school portals fulfill the requirements set by the ministry of education?
- 2) How can school portal be utilized as an educational platform of blended learning and its mentioned outcomes?

#### 3.3. Research Method

To provide an answer to question No. 1 a survey based on the criteria above was done on randomly 20 (N=20) chosen school portals in Israel. Two unbiased reviewers, both with academic background, filled up a grid Likert (1-5, 5=Always exists, 1=Not at all) questioner based on selected parameters drawn from the mentioned ministry of education's list of criteria for school portal.

To provide an answer to question No. 2, a case study was conducted on two groups of 4 fourth grade pupils of the researcher. The fourth-grade pupils in the school were given an authentic assignment to imagine they were given the right to plan a settlement. They were told to choose the format of the settlement

and to consider every aspect that can be reasonable to form in their imaginary place. They had to choose its name and elaborate on its nature.

For several years as a teacher of online learning I conducted my teaching activating authentic assignments on my school portal. I hardly posted information in the site. Instead, I assign my pupils to imagine situations and write about them. All that in collaborative methods using google websites features to embed the pupils' documents in them. By this, to put forth the pupils' works for feedback. This action increased the pupils' motivation to participate in this kind of endeavors.

The assignment given to the fourth-grade pupils in this research was written in the school portal in the "Building a settlement page" with these words: "You are a group of young adults that live with your parents in a settlement that is overpopulated and cannot absorb you anymore. Since you want to stay together as a group of friends, you decided to form a settlement by yourselves. In this case you set for a meeting in which you detailed your initiative to governmental factors and laid before them your program. You can choose the format of the settlement: City, village, collective settlement, neighborhood, or agricultural place etc. You may choose the location in the county: center, north or south of the county. You may decide what is the feature of the settlement whether it'll be open for everybody how wants to settle or open just for your group. You may add some other characteristics as well".

### **3.4. Group and collaborative work**

The children were asked to gather in groups of minimum 3 and maximum 5. They were suggested to work at home alongside with the work in class. I convinced the pupils to activate collaborative work in class and at home. The collaborative work on the assignment was enabled by sharing one google drive document between the members of each group, the instructor and the class' homeroom teacher. This action enrolled the homeroom teacher in following the process of learning and the development of the pupils' advancement in writing.

### **3.5. Interview**

Two collaborating groups of 4 pupils each were interviewed in the beginning of March 2020 before the burst of the Covid-19 crisis in Israel. The interviews were semi-structured. The groups were selected after they completed their tasks and got published in the assignment page. The discussion was enrolled in asking for the pupils' impression of their assignment's work process. During the interviews I indicated the pros and cons of the pupils' work outcome and discussed suggestions about their writings, their self-learning of collaboration means how to present their ideas. The interviews were recorded and transcribed and analyzed with content analysis (Côté et al., 1993).

## 4. Analyses and Findings

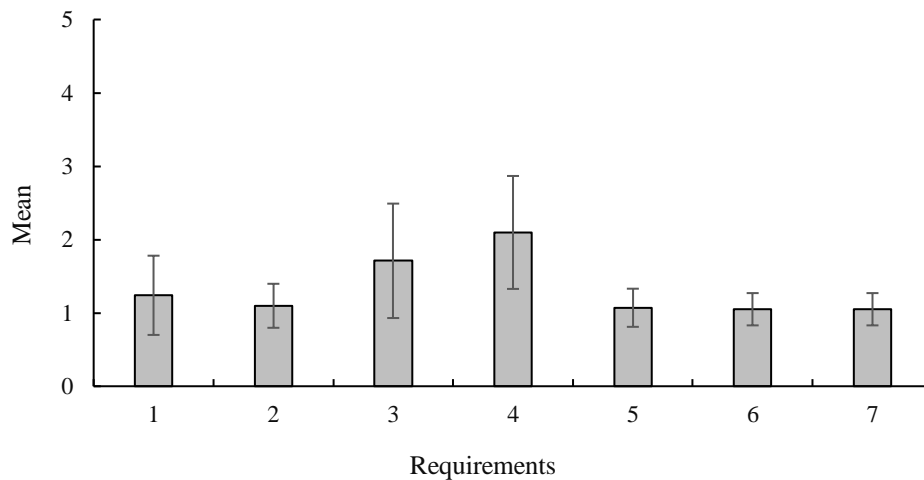
### 4.1. Research question No. 1

Means and standard deviations of the 1-5 Likert scale of the compliance of the Israeli school portals with the ministry of education's requirements are shown in table 1.

**Table 1.** Results of the 1-5 Likert scale regarding the compliance of the Israeli school portals with the ministry of education's requirements

Ministry of education's requirements	Mean	Std
1. The portal exists as a platform for online learning	1.24	0.54
2. The portal shows the implication of online learning and instructing to the community	1.097	0.30
3. The activation of students in the virtual space exists with adaptation to the technological language that they "speak" such as ongoing messages, learning activities, virtual learning frameworks etc., is implied	1.71	0.78
4. Management and organization of the pedagogical knowledge exists and set to knowledge areas and age strata. There are links to learning websites, content providers and the ministry of education's main educational content portal	2.097	0.77
5. Development of self-regulated learner-the portal performs as a learning gate that opens many possibilities that are flexible to learning independently and supports self-regulation	1.07	0.26
6. Collaborative learning in the portal is promoted the means of blogs, forums, social networks and discussion groups. A digital multi-discussion exists in the class environments, learning debates about subject matters. The portal's interface invites a production of group product such as clips, portfolio and essays	1.05	0.22
7. Virtual school's community – Findings show that activities implied around the school portal strengthens the community togetherness. The cooperation between the listed factors: teachers, students, principals, parents etc. for example: it is possible to see the school's vision was composed in a shared manner with the school's community	1.05	0.22

Figure 1 presents the results graphically. It clearly shows that all the requirements are poorly fulfilled. The only requirement which ranked slightly over "2" (out of 5) was related to management and organizational aspects and not to pedagogy. The mean scores of all other requirements were between 1-2.



**Figure 1.** Compliance of school portals with the Ministry of Education's requirements (1-5 scale)

## 4.2. Case study qualitative findings

Transcribed text of recorded interviews raised these categories:

**1. Instructor's mediation:** the instructor asked leading questions toward the mutual observation on the pupils' thinking process and refining it by agreement. For example: The necessity to differentiate between face to face explanation and distant explanation with hypertext in webpage.

"Don't talk to me face to face, imagine I am not next to you, you have to select a mean to explain it to the reader from distance".

"I need an explanation to the term petal. What can you do in computerized means to explain it to me?"

"In Wikipedia there are things like that, but one must explain what is petal, correct? The creator of the document must create a situation in which with a click of one mouse button the reader gets an explanation. Pupil: A link! Instructor: Thank you very much, a link!"

Another aspect of instructor's mediation is to elevate the discussion beyond the technical dimension and to promote a cultural view.

"Then what does this mall include? Look at what you as a group detailed in this mall: Stores, restaurants, post office, it is like all these people's life is around stores and restaurants, when you constantly eat in a restaurant you do not eat at home."

**2. Collaborative learning process:** The pupils reported that the technology they used summoned collaboration. They discovered it by themselves without any given instruction. For example: Discussing work methods.

"In the beginning we formed the group from what we were used to in the past. We started in the thinking about the settlement at the lesson itself and every one of us through an idea."

Discovering technical means for distant collaboration.

"It is not exactly to meet face to face, it was more meeting on the cellphone, sending text messages of what one suggests changing in the work..."

Discussing and suggesting corrections and improvements

"At the beginning I went into the shared document of the work on the city and started to work on my paragraph. While working on it, I saw problems in Talia's paragraph. It was not so pleasant, but I took the initiative to ask her if I can make some changes in her text."

Understanding the advantage of collaborating friendly technology.

"It means that we as a group did not have to struggle for writing space, we manage to agree on most dilemmas and that what gave the uniqueness to our invention."

**3. Use of previous knowledge:** Footprints of previous experience in the text. This previous experience was essential when combined with the collaborative process of learning.

"Instructor: The term petal that you used in the document to form the city you have created, where did you learn it? Talia: In sciences lesson. Group: They taught it in kindergarten."

"From one point of view we wanted an original idea but from the other point of view, we wanted to take it to our life experience, that our plan will be taken from our lifestyle, connected to T.V, cellular phones etc."



**4. Technological mediation:** Since the collaborative work evoked inquiry zones it created new needs. One of these needs was to acquire new technological abilities. This need had to be addressed in order to provide a continuous learning environment that correlates with the essence of the media.

"Chose the term with the mouse and then right click, search beyond the first suggestions and let's go to the shortest explanation and to the dictionary definition."

"This is amazing: everything that you change in your shared document will automatically change in the webpage where it is presented. That means that you can change it even after 20 years when you become wiser! It happens because the site calls the document but is not involved in the document itself. You are responsible for the appearance of the site through the document."

**5. Agreements:** Agreements within the groups and between the groups and the instructor were immanent component of the learning process.

"At the beginning the group volunteered to write for me because I was ill, and we had a time limit. Then I looked at what they wrote and asked for the group's permission to rewrite it according to my original thinking."

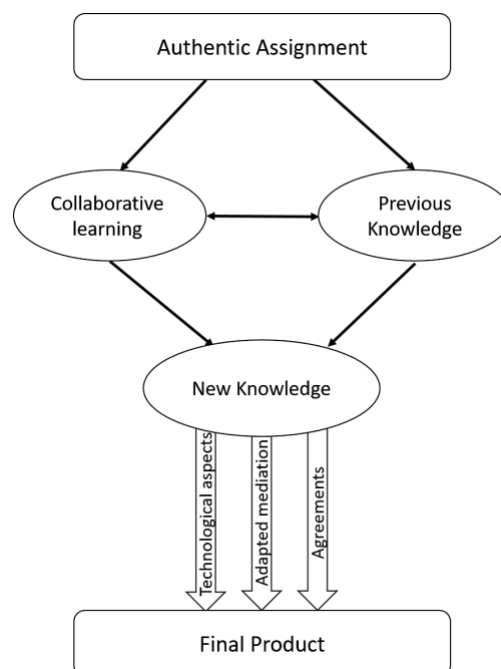
**6. New knowledge:** Every learning process requires creation of new knowledge. In this process a new knowledge stemmed as a result of collaborative learning, previous knowledge and adapted types of mediation

"This shared document was a mean of communication between us, a tool that we manage to self-learn it and use it's communicational feature for our benefit."

"In my opinion the collaboration was the most important discovery. That is because it came obvious that without collaboration this document would not come out."

"we discovered that when all the text was open to every member of the group, we were all driven to work together on elevating the learning product."

These six main categories do not stand alone but linked one to another as shown in figure 2. The process begins with an authentic assignment that motivates the following stages.



**Figure 2.** Group learning process stemming from an authentic assignment

### **4.3. Discussion**

#### **4.3.1. School Portal's Performance**

The randomly explored school portals show a poor performance of most parameters set for the examination from the Israeli ministry of education's goals. It shows that the schools utilize their portal for managerial aspects of and less for pedagogical possibilities. The majority of the examined school portals are practically used as bulletin boards.

The authentic assignment that was presented in this research was originally placed in a school portal. All the learning process was embedded in webpages in this portal. The learning process enabled practicing new opportunities.

#### **4.3.2. Blended Learning Opportunities**

The qualitative inquiry demonstrates a large spectrum of blended learning opportunities that were given to the pupils. The authentic assignment that requires use of imagination and life experience (Steiner, 2016), allowed the participants to "fly". They were not limited by question and answer, and therefore, they were more engaged in the learning process. As Schunk and Mullen (2012) emphasized, the involvement of the pupil's emotional and cognitive energy drove them to fulfill the task positively. Pupils reported that most of the corrections were done by themselves without the need of instructor's involvement. The instructor's approach in these interviews was to meet the pupils in an equal situation and learn together. The discussions with the instructor gave an opportunity to overlook at the culture that the pupils are living at. What they chose to post in their city revealed their daily culture. The discussions between the pupils and the instructor provided another lens, in which the pupils could decide to make changes according to the new vision achieved in the conversations.

#### **4.3.3. Self-Regulated Learning and the development of collaborative learning methods**

The pupils expressed satisfaction because they felt free to self-learn and invent methods of collaboration (Halverson & Graham, 2019). They reported that they respected each-other's ideas while they made changes in each other's shared documents. The work that was done on Google Drive© allowed for this kind of collaboration methods. They discovered the possibility to create and write the same document together. They made use of the sharing feature of documents to create their statements on a shared surface. They could type and delete each-other's writings and preferred to do it respectfully. As Steiner (2016) stressed, the current findings show that in the Strategy Project assignment, the pupils learned to manage time, to communicate, and make use of strategies for assimilation and implementation of the knowledge acquired. By being published in the school portal, and within the interviews, they were given feedback on reflective thinking and goal-directed interaction with classmates and the instructor as well.

The learning process reported in the current research demonstrates number to stages that contributed to a successful outcome. The interrelationships between the components of the process may change but this research suggests that authentic assignment, collaborative learning, use of previous knowledge, agreements and adapted types of mediation are major contributors.

## 5. Conclusion

The poor results of the school portal's performance indicate a clear abandonment of school portal as a pedagogical and communal educational instrument. School all over the education system in Israel, actually gave up using school portal as a pedagogical mean. The current research does not suggest bringing the portal back to the previous activity. It suggests a different method of using the portal which is collaborative blended learning encouragement. What this research is trying to do is persuade that school portal can be activated pedagogically. The research shows the poor current picture with a proved evidence that this situation can be changed. The fact is that during the Covid-19 pandemic period, schools had to rush into online activity adapting rapidly to the new reality. This urgency caught teaching staff and pupils unprepared. The adaptation to online instruction took a long and sometime wasted time. In order for children to become familiar with distant learning in situation of emergency, educators must expose them to a variety of non-frontal learning methods within existing online platforms. These learning methods are beneficial in peaceful time as well.

The technology that is rapidly and widely develops in the last few years, invites the implementation of new and different teaching and learning methods. Further research should consider looking into these new methods in the context of out-class learning.

## References

- Adya, M., Temple, B. K., & Hepburn, D. M. (2015). Distant yet near: Promoting interdisciplinary learning in significantly diverse teams through socially responsible projects. *Decision Sciences Journal of Innovative Education*, 13(2), 121–149.
- Arnold, U. (2000). New dimensions of outsourcing: A combination of transaction cost economics and the core competencies concept. *European Journal of Purchasing and Supply Management*, 6(1), 23–29.
- Barki, H., & Pinsonneault, A. (2005). A model of organizational integration, implementation effort, and performance. *Organization Science*, 16(2), 165–179.
- Côté, J., Salmela, J. H., Baria, A., & Russell, S. J. (1993). Organizing and interpreting unstructured qualitative data. *The Sport Psychologist*, 7(2), 127–137.
- Graham, C. R. (2013). Emerging practice and research in blended learning. In M. G. Moore (Ed.), *Handbook of distance education* (3<sup>rd</sup> ed., pp. 333–350). Routledge.
- Graham, C. R., Henrie, C. R., & Gibbons, A. S. (2014). Developing models and theory for blended learning research. In A. G. Picciano, C. D. Dziuban, & C. R. Graham (Eds.), *Blended learning: Research perspectives* (Vol. 2, pp. 13–33). Routledge.
- Halverson, L. R., & Graham, C. R. (2019). Learner engagement in blended learning environments: A conceptual framework. *Online Learning*, 23(2), 145–178.
- Long, S. K., & Carlo, H. J. (2013). Collaborative teaching and learning through multi-institutional integrated group projects. *Decision Sciences Journal of Innovative Education*, 11(3), 233–241.
- Lord, G., & Lomicka, L. (2008). Blended learning in teacher education: An investigation of classroom community across media. *Contemporary Issues in Technology and Teacher Education*, 8(2), 158–174.
- Masie, E. (2002). Blended learning: The magic is in the mix. In A. Rossett (Ed.), *The ASTD e-learning handbook best practices, strategies, and case studies for an emerging field* (pp 58-63). McGraw-Hill.

- Metros, S. E. (2005). Visualizing knowledge in new educational environments: A course on learning objects. *Open Learning*, 20(1), 93–102.
- Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A review of current literature and directions for future research. *The DATABASE for Advances in Information Systems*, 35(1), 6–36.
- Rosenfield, P. L. (1992). The potential for transdisciplinary research for sustaining and extending linkages between health and social sciences. *Social Science and Medicine*, 35, 1343–1357.
- Schunk, D. H., & Mullen, C. A. (2012). Self-efficacy as an engaged learner. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 219–235). Springer.
- Stefanou, C. R., & Salisbury-Glennon, J. D. (2002). Developing motivation and cognitive learning strategies through an undergraduate learning community. *Learning Environments Research*, 5, 77-97.
- Steiner, H. H. (2016). The strategy project: Promoting self-regulated learning through an authentic assignment. *International Journal of Teaching & Learning in Higher Education*, 28(2), 271–282.
- Temple, B. K., & Allan, M. (2000). Engineers and business: Spanning the divide by means of cross-disciplinary activities. *British Journal of Engineering Education*, 1(1), 9-20.
- Williams, J., & Chinn, S. J. (2009). Using Web 2.0 to support the active learning experience. *Journal of Information Systems Education*, 20(2), 165-174.