

# Leading Teachers' Towards the Needs of Pedagogical and Technological Skills Acquisition in the Next Generation Learning Spaces (NGLS)

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## Abstract

This study was conducted to develop Next Generation Learning Spaces (NGLS) in teachers' pedagogical and technological tools. This is to explore new perspective in teachers' pedagogical and technological leadership in secondary schools in Malaysia. Design and development research (DDR) approach as a research design in this study was conducted in three phases; need analysis phase, design and development phase and evaluation phase. The first phase is to identify the needs of having the NGLS pedagogical framework and managing teachers' leadership in teachers' pedagogical and technological tools in secondary school in Malaysia. A quantitative approach research design was conducted and the purposive sampling technique was applied to collect data from 260 samples. The overall findings of the first phase showed that the mean score for the learning spaces is the highest (mean = 4.023) followed with the teachers' pedagogical strategies (mean = 3.007). Technological tools are the lowest mean score (mean = 1.708). The main findings of this study indicated the need of Next Generation Learning Spaces among respondents. Therefore, the study provided useful evidence and potential to design and development of pedagogical framework in leading teachers' pedagogical and technological tools.

**Keywords:** Teachers' leadership, Next Generation Learning spaces (NGLS), teachers' pedagogy, technology tools, design and development research (DDR).

## INTRODUCTION

The 2030 Agenda for Sustainable Development (SDG comprising 17 Sustainable Development Goals (SDGs) , which is covering social and developmental dimension of human life, society and economic (UNESCO, 2016). SDG 4 is referred to the important role of education to ensure education system must be relevant and inclusion, equity and quality for the future generation to develop creative and critical thinking, collaborative skills and embed with technology. According to the report from the Organization for Economic Co-operation and Development (OECD); aims to improve learning environments and supported the pedagogy, curriculum assessment and managing the teachers as the leader in the classroom for the 21st century education system (López et al., 2019; Nurulain Hamzah et al., 2016) . In considering education trend , Ministry of Education Malaysia (MOE) has proposed eleven shift to transform the education system in Malaysia (MOE, 2013). The transformation of education system required teachers to be leader in classroom in teaching approach; supported by appropriate technological tools in new learning spaces to enhance the student outcomes (Blank,2014). For example, the teacher's role as a leader in new learning spaces with emerging pedagogical and technological skill knowledge to the learners. Teachers lead the students to use the digital technology such as google

classroom, how to use the padlet and collaboration with the students; creating new interactions whereby rather than being just a technological tools within the learning spaces. The Next Generation Learning Spaces (NGLS) is a comprehensive framework to explore new perspective in education. These spaces represent new learning modes, innovative uses of space with the combination of technology and pedagogy (Radcliffe et al., 2008). In term of NGLS, teachers as leader to measure the effectiveness of pedagogical approach in line with knowledge of technological skills in formal and informal learning spaces. In order to promote the transition in education, teachers need to present themselves in terms of leadership (Khalip Musa & Mohd Khairi Md.Akhir, 2019).The effectiveness of leadership in the classrooms is the measurement in developing the NGLS conceptualize framework in teachers' pedagogy and technology tools (Yuet et al., 2016; Kho, 2020).

Next-generation education was designed for the Industrial Age, but with NGLS, the classroom environment of the future will be designed for the Digital Age (Arstorp, 2018). The Pedagogy-Space-Technology (PST) paradigm, also known as Next Generation Learning Spaces (NGLS), allows institutions to build innovative teaching and learning spaces that will improve student results (Ling & Fraser, 2014).NGLS is a positive approach for teaching in new generation of students in active learning, collaborative, blended, flipped, group work, experimentation and role playing (Radcliffe et al., 2008). Learning spaces should be able to inspire teaching and promote learning as an activity, support collaborative as well as formal practice, provide a personalized and inclusive environment, and be flexible in the face of changing needs as referred in The Designing Spaces for Effective Learning report (JISC, 2006). Leading teachers in next generation education allow them to implement different teaching approach as well as to shift from teacher-led learning to student-directed learning, reduce skilled exposure time and improve collaboration. Teachers must function as role models in the new learning paradigm (Blank, 2014), developing their conceptual and practical expertise in the classroom to enable collaboration among teachers-students, students-students, and teachers-teachers, where leadership emerges in learning environments (Yuet et al., 2016; Kho, 2020).

To accomplish this, the rapid transformation with different strategies is required to enhanced next generation education. Leading teachers in innovative teaching and learning environments are in line with teachers' pedagogical and technological tools in next generation. Learning spaces should have to redesigned to be flexible and support next generation teaching and learning environment. Classroom's furniture and equipment can be reconfigured for flexible instructional environments (Boothe & Clark, 2014). In next generation education; many schools are replaced traditional classroom with innovative flexible learning spaces to enhanced 21st century learning (Kariippanon et al., 2019). Therefore, teachers required to extend their leadership knowledge and technological skills to assimilated in future education and aid the process of teaching and learning (Khalip Musa & Mohd Khairi Md.Akhir, 2019; Yuet et al., 2016; Kho 2020). However, teachers face tough challenges because of low technological knowledge (Nurulanis Ahmad @ Mohamed et al., 2019); limited accessibility and network connection, limited technical support, lack of effective training, limited time and lack of teachers' competency in using the technology tools (Ghavifekr et al., 2016). In order to explore new perspective in education, the objective of this paper is to investigate the Needs of Pedagogical and Technological Skills Acquisition in Next Generation Learning Spaces (NGLS).

## LITERATURE REVIEW

The transition from traditional approach such as teacher-centred to student-centred; can make teaching and learning more interesting with collaborative and interactive style of learning spaces (Chun & Sathappan, 2020; Georgiev et al., 2004). To incorporate flexible and informal open plan layouts; Finland recently undertook an ambitious school redesign project to foster positive emotional experiences, collaborative working and interaction as well as creativity among the teachers as leader in classroom to enhance the students outcomes (Halinen, 2018; The Finnish National Board of Education, 2016). In implementation of educational technologies, variety of programmes in Finland concentrating in maker practice as new learning spaces in the new curriculum (Balakrisnan et al., 2021; Halinen, 2018; The Finnish National Board of Education, 2016). The Malaysia Education also taken the grand move

to transform and leading teachers pedagogical and technological skills in new learning spaces (Malaysia Ministry of Education, 2013) . To upskill teachers' leadership to embrace pedagogical and technological in next generation learning spaces, the Ministry of Education (MOE) have initiative to roll out a professional programme for teachers to enhance capacities and capabilities of teachers in utilising digital technology in their pedagogy as well as how to lead their students in the new learning spaces (EPU, 2021). "My Digital Teachers" programme have introduce in Thrust 04 strategies 5; Economy Blueprint 2021 to inspire teachers to lead each other in pedagogical and technological skills in NGLS.

Learning spaces can carry unspoken message to build a successful pedagogical and technological skills to strengthen students' engagement. The learning spaces as "third space" and can develop contemporary of teaching and learning, beyond the traditional to formal and informal , unconstrained by classroom wall and teachers are free to leading the classroom in virtual and formal learning (Schuck et al., 2017). Teachers' leadership will improve their practice at greater rates when they teaching with better quality environment; teacher collaboration matters for student learning , and it matters for how teachers learn to lead (Berry, 2019) . However the finding (Golam Jamil and Paul, 2016); teachers face challenges in their pedagogy in collaborative learning due to learners' lack of the group work skills , unsuitable physical learning spaces ( classroom) or the learners' seating arrangement, domination of individual space. Therefore, the teachers' leadership as role model in classroom can enhance the collaboration among students, students' behaviour , students' outcomes in conducive of learning spaces (Khalip Musa & Mohd Khairi Md.Akhir, 2019; Nurulain Hamzah et al., 2016).

Online learning attempts to provide flexibility to ubiquitously learning for both the instructors and learners (Ana Haziqah A.Rashid et al., 2021; Hapini Awang et al., 2019; Keppell & Riddle, 2012) . According to (Temple. P, 2007), redesigning learning space on new flexible criteria may not be enough in influencing pedagogy. NGLS have to align teachers' pedagogy with technology tools. Technological tool and education activity which are not supported by appropriate pedagogy will become a waste of time (Göçen, A., Eral S.H., & Bücü, 2020). Teachers need to ready with the latest technological knowledge as well as boosting their confidence and inspiration in integrating technology in their pedagogies (Whai & Ling, 2020). Teachers need to adoption of new approaches to teaching practice. Teachers have to use pedagogical image for use of technology in learning spaces as some learners may more knowledgeable about technology rather than the teachers. Thus, there is the need for teachers as a leader in learning spaces to develop an individual pedagogical image align with technological knowledge (Hall-van den Elsen & Palaskas, 2014). Teachers need to conceptualize the pedagogical and technological belief to influence teaching practice in new learning spaces.

According to definition by the Centre for Strengthening the Teaching Profession (2009), teachers have to focused on common leadership values, leadership knowledge and leadership skills as required in the NGLS. Teachers' leadership attributes consist of knowledge, skills and values shown by teachers who have a positive impact on student learning directly or indirectly in the formal and informal learning spaces (Phelps, 2008; Strengthening Center for the Teaching Profession, 2009). Teachers' leadership also helps to improve students' skill in use of technology in NGLS. Teachers have to construct their leadership knowledge by actively participating in an online instructional practice in enhancing student achievement and ensuring that these were embraced, embedded and reinforced (Fullan, 2010). There was evidence to suggest that student outcomes were more likely to improve where leadership sources were distributed throughout the school and where teachers were empowered with their pedagogical and technological skills related to instructional practices and assessment (Silins & Mulford, 2002; Norazlinda Saad & Surendran Sankaran, 2013).

## **TEACHERS' LEADERSHIP IN NEXT GENERATION LEARNING SPACES (NGLS)**

NGLS encourage learners to engage within a carefully scaffolded learning spaces in both formal and informal ways, finding out information, working with peers and on their own, searching information through Google and discussing an issue with their teacher. NGLS can be supported to understand the ways that teachers as a leader in new learning spaces. Teachers must know “how to teach” and “how to use technology” in NGLS. Teachers need to lead each other to enhanced teaching culture in NGLS (De La Harpe et al., 2014). To flourish the practice of teacher leadership in NGLS, teacher leaders must possess the leadership knowledge and skills. Teachers must able to present their technological material effectively in managing their learning spaces, facilitate maximum involvement in their pedagogical approach and ultimately enhanced student learning (Bolkan & Goodboy, 2009). In NGLS context, the role of the teacher is to facilitate a process of learning and teachers’ act as a role model in providing a source of feedback (Ling & Fraser, 2014). NGLS learners are characterized by having relationship with technology, personalized learning and promoting active learning. Teacher leaders need to adapt and customize their pedagogical and technological skills to suit their needs.

Technology is continually changing, but teachers have a variety of resources at their disposal to help them improve their technological skills in the classroom. In NGLS, technology is used as a tool in teaching, evaluating the students’ progress and making the teaching and learning goal. Teachers’ role changes as well and no longer the center of attention; but rather play the role of leader and setting the project goal, as well as providing guidelines and resources. Teachers should have new digital habits, and should be trained in the use of new technologies. Teacher leaders are facing new pedagogical challenge; needs to changing the way classrooms work and providing new ways to lead (Mallik & Mallik, 2019). Teachers’ leader can provide the suggestions and support for student activity based on student to student or group to group. Google Meet, Google Classroom, and Zoom are examples of virtual learning systems that could be used for teaching and learning (Iftakhar, 2016; Mai & Muruges, 2018). Teachers need to enhance their technological skills, adapt and meet the educational demand to improve the students quality in NGLS (Mat Rahimi Yusof et al., 2021). Teacher leaders have able to stimulate the learners using the internet as one of teaching tools in the new learning spaces (Azlina Musa et al., 2021).

## RESEARCH METHODOLOGY

Design and development research (DDR) is an approach that combined a very organized and systematic process in producing a development study that begins with the first phase, which is the needs analysis phase (Richey & Klein, 2007). DDR approach can be applied in different discipline of research such as engineering, medical research and education (Mohd Ridhuan Mohd Jamil, 2016; Muhammad Fariduddin Wajdi Anthony et al., 2019; Muhammad Fariduddin Wajdi Anthony & Azidah Abu Ziden, 2019; Muhammad Nidzam Yaakob, 2016; Sukor Beram et al., 2020). A purposive sampling has been chosen for a specific purpose and this type of sample may satisfy for the need analysis phase (Cohen et al., 2018; Muhammad Nidzam Yaakob, 2016). The researcher used the DDR approach as research design and need analysis is the first part of the study. The main focus in this article is to discuss the needs in leading teachers’ towards the acquisition of pedagogical and technological skills in Next Generation Learning Spaces (NGLS).

Samples for this phase consists of 260 secondary school teachers which were selected using purposively sampling (Cohen et al., 2018; Creswell, 2014; Gay et al., 2012). The samples were from northern region of West Malaysia such as Kedah, Penang, Perak and Perlis. Sample selection was based on particular criterion as described below:

- i. Secondary school teachers
- ii. Five years and above teaching experience
- iii. Considerable level of knowledge and experiences of the technological approaches in teaching.

Data can be collected using an internet survey and administered online (Fowler, 2009; Nesbary, 2000; Sue & Ritter, 2012). Researcher has distributed the survey questionnaires through Telegram and WhatsApp (Cohen et al., 2018; Gay et al., 2012). Respondents have to indicate their degree of agreement on a 5-point Likert scale, namely 1=Strongly Disagree, 2 = Disagree, 3 = Moderately Agree, 4 = Agree, 5 =Strongly Agree. The need analysis instrument is developed based on literature review and adapted from the earlier survey questions. Need Analysis questions are divided into four main sections as shown in Table 1.

**Table 1:** Research instrument summary for need analysis

Section	Main Variables
A	Respondent Demographic
B	The need in learning spaces
C	The need of pedagogical approach
D	The need of technological tools

Descriptive analysis, frequency and mean analysis were used to determine the teachers need in NGLS related with pedagogy and technology tools (Cohen et al., 2018; W.Creswell, John, 2018) in Table 2.

**Table 2:** Need analysis mean interpretation table

Mean Score	Interpretation
4.01-5.00	High
3.01-4.00	Moderately High
2.01-3.00	Moderately Lower
1.00-2.00	Low

## FINDINGS AND DISCUSSION

Need analysis questionnaires respondents involved 260 teachers in secondary school in northern region of Malaysia. Data analysis is using *Statistical Package for Social Science* (SPSS) Version 27.0. Questionnaire instrument is applied in survey method. Based on descriptive analysis, frequency and mean analysis were used to determine the teachers' need in NGLS related with pedagogical and technological tools.

### Respondent's Demographic

The study was conducted through online survey to 260 secondary school teachers in northern region school in Malaysia. The demographic information of the respondents is summarized in Table 3.

**Table 3:** Demographic of Respondents

Variables		Percentage (%)
Gender	Male	21.5% (N=56)
	Female	78.5% (N=204)
Race	Malay	81.5% (N=212)
	Chinese	7.7% (N=20)
	India	7.7% (N=20)
	Others	3.1% (N=8)
Profession	Teacher	100% (N=260)
Working experience	5-10 years	6.5% (N=17)
	11-15 years	26.2% (N=68)
	16-20 years	25.0% (N=65)
	21 year and above	42.3% (N=110)
Level of Education	Bachelor Degree	78.5% (N=204)
	Master Degree	20.4% (N=53)
	PhD	1.2% (N=3)

Female teachers portray the highest participation in this study which is 78.5% (N=204) as compared to male teachers, 21.5% (N=56). The highest participating percentage of secondary school teachers are 21 years and above of working experience in teaching 42.3% (N=110). These is followed by those in the 11-15 years of experience 26.2% (N=68), 16-20 years of experience 25.0% (N=65), 5-10 years of experience 6.5% (N=17). Around 78.5% (N=204) of the secondary school teachers have a bachelor degree and 1.2% (N=3) have a doctor of philosophy (PhD).

### Learning Spaces

Table 4 showed the interpretation mean score for the learning spaces. A workshop /studio space for art, music or design is the highest mean score 4.43 (SD=0.777) and a workshop space for technology (wood, metal, plastic, robotics) mean score 4.43 (SD=0.719). From the results, flexible spaces have an impact on teachers' pedagogy. However, the result reveals that a traditional classroom with no access to break out spaces is the lowest mean score 2.44 (SD=1.266). A traditional classroom with direct access to break out spaces for collaborative group work, project work or individual work has moderately high in interpretation mean score 3.92 (SD=1.016). Teachers probably need a collaboration teaching area whereby the teachers and students share a variety of connected learning spaces was moderately high mean score 3.93 (SD=0.994). This implies that some teachers were able to use a space in a corridor outside the classroom as their learning spaces with mean score 3.89 (SD=1.054).

**Table 4:** The needs in learning spaces

No	Learning Spaces	Mean Score	Standard Deviation (SD)
	What do you need in your learning space at the school you are teaching?		
1	A traditional classroom with no access to break out spaces	2.42	1.26
2	A traditional classroom with direct access to break out spaces for collaborative group work, project work or individual work	3.94	1.00

3	A collaborative teaching area (2 or more teachers) whereby the teachers and students share a variety of connected learning spaces, for example collaborative group work, project work or individual work	3.96	0.99
4	A space in a corridor outside the classroom	3.91	1.05
5	A workshop space for technology (wood, metal, plastics, robotics)	4.40	0.82
6	A workshop/studio space for art, music or design	4.40	0.75

### Pedagogical Approach

The researcher also conducted questionnaire about the need of pedagogical approach in NGLS. The findings were shown in Table 5. The highest mean score for pedagogical approach in active learning is 3.71 (SD=1.090). Teacher-centred reveals the lowest mean score 2.88 (SD=1.102). This implies that some of the teachers were ready for the transition from traditional approach to student-centred with mean score 3.70 (SD=1.015). The interpretation for blended learning is moderately lower with mean score 3.00 (SD=1.042). The finding also shown personalised learning is moderately lower with mean score 2.30 (SD=1.021) and project-based learning with mean score 2.39 (SD=0.913). Therefore, total mean score for pedagogical approach is 2.9967 (SD=1.0300) which is moderately lower than the mean score.

**Table 5:** The needs of pedagogical approach

No	Pedagogical Approach	Mean Score	Standard Deviation (SD)
1	Teacher-centered	2.88	1.10
2	Student-centered	3.70	1.02
3	Blended learning	3.00	1.04
4	Personalised learning	2.30	1.02
5	Project-based learning	2.39	0.91
6	Active learning	3.71	1.09

### Technological Tools

The need of technology tools in NGLS are shown in Table 6. Finding shown that WhatsApp is the highest score 3.65 (SD=1.284) in the needs of technology tools used, followed with Telegram with mean score 3.25 (SD=1.380). The teachers were probably not ready to use Padlet in their learning space with mean score 1.47 (SD=0.893). Programming using Scratch and Magnetcode also shown the lowest mean score; 1.20 (SD=0.570) for scratch and 1.25 (SD=0.712) for Magnetcode. The interpretation of mean score for Google Meet is moderately high with mean score 3.07 (SD=1.296). Google classroom also shown the mean score 2.69 (SD=1.236) which is moderately lower in interpretation of mean score. This indicates that teachers use technology in their teaching process while some of them were not. The total mean score for technological tools used are lower with mean score 1.7078 (SD=0.8560)

**Table 6:** The needs of technological tools

No	Technological Tools	Mean Score	Standard Deviation (SD)
1	Google Classroom	2.69	1.24
2	Padlet	1.47	0.89
3	Quizizz	2.36	0.89
4	Scratch	1.20	0.57
5	Magnetcode	1.25	0.71
6	Zoom	1.65	0.92
7	YouTube	2.85	1.09
8	Google Meet	3.07	1.30
9	Telegram	3.25	1.38
10	WhatsApp	3.65	1.28

## DISCUSSION AND CONCLUSION

The finding revealed that teachers still show the weakness in term of learning spaces, pedagogy and technology tools in developing the NGLS. The total mean score in technology 1.7078 (SD=0.8560) indicates the needs of pedagogical and technological framework in teachers' pedagogy and technology tools. Teachers' leadership needed in the transition of the pedagogical and technological knowledge, skills, behavior and technology habits among teachers (Idarwana Hasin & M. Khalid M.Nasir, 2021). Teachers need to change their own perception in teaching and trying to adapt the best ways in new learning spaces. Teachers' leadership is crucial role in order to ensure the students use the technology tools in learning. Teachers would be able to planning and creating more creative and effective materials for next generation learners during the process of teaching and learning in the learning spaces. However, lack of knowledge and skills in application technology tools such as coding and programming; Scratch, Magnetcode, Quizizz, online learning; youTube, Google Meet, Google Classroom, Padlet make the teachers unable to lead the students in using and accessing the technology tools in learning spaces. Although teachers have experience in teaching but are less skilled can causes students to gain no benefit for the technology initiative that provided by MOE (EPU, 2021; Malaysia Ministry of Education, 2013). There are understanding of learning spaces reflects the contexts for next generation learners (Campbell, 2020); attributed the use of spaces, influences by pedagogy, innovative learning with digital technology, aligns with the physical space. For examples, there has a fundamental mental shift toward creating contents in teaching with low-cost hardware and software such as video, blog, Facebook, Instagram and Pinterest post. The increasing range of network that inhabit teachers' leader through social media; connected interaction, development of knowledge via virtual and physical network in new personalized learning spaces. Teachers' leading the learners to be able work, learn, lead and creatively in collaboration with peers whenever and wherever they needs (Johnson et al., 2012).

In NGLS, pedagogy impact the student-centered learning with students taking an active role in the learning process rather than being inactive learners and passive recipients of information from the teachers (Rao, 2020). Technology tools in NGLS explained the transition learning to blended learning in teachers' pedagogy. Learning tools such as ZOOM Cloud Meeting and Google Drive are presently essential to support virtual learning in NGLS. Various teaching and learning modes like media social (Facebook, WhatsApp, Telegram), pre-recorded lecture videos (YouTube), live video conferences (Zoom, Microsoft Teams) were deployed in virtual learning (Ahmad Alif Kamal et al., 2020). Google Classroom has good potential to support teachers' pedagogy in NGLS. Teachers' leader have to developed their knowledge by actively participating in an online pedagogy and enhanced instructional practices. Pedagogy can happened at anytime and anywhere (Abidin & Saputro, 2020) in ubiquitous learning spaces.



In conclusion, the aims of this research are to inform policymaker about possible future classroom settings desired or envisioned by teachers' leadership in new learning spaces in line with 21st century skills. Teachers' leadership have experience to conduct the teaching strategies in their learning spaces. However, lack of pedagogical technological knowledge and skills, teachers' leader are not able to carry out the efficiency and effectiveness of technology tools to enhanced teaching and learning in NGLS. The weakness of the teachers' role in technology indicates the needs in developing the NGLS conceptualize framework in teachers' pedagogy and technology tools. The three key aspects of the PST framework are taken into NGLS conceptualize framework in leading teachers' pedagogical and technological skills to understand the ways teaching and learning have changed in NGLS. Teachers' leader needs a pedagogical framework embedded with technology and learning spaces to enhanced pedagogy in next generation learners. Teachers as the role model to the learners to guide and support the students in ubiquitous learning spaces. Teachers need to use their pedagogical and technological skills design efficiently and effectively to fit with NGLS. Teachers who not have to use or lack of experience and knowledge in pedagogical and technological skills may have difficulties to be the leaders in new learning spaces to the learners. Knowing how to applied suitable pedagogies, how to use technologies is essential to teachers as a leader in NGLS. For future research, this research study will shift to phase two in design and development which is involved 13 expert panels in curriculum, pedagogy, learning spaces, technology and senior lectures in developing the NGLS conceptualize framework based on the expert's consensus.

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