Integrating Technology to Promote Learning and Teaching Management Through Coaching Process for Teachers in Bangkok Metropolitan Administration

Chutiwat Suwatthipong, Sukhothai Thammathirat Open University, Thailand
Pimprapa Phanphai, Sukhothai Thammathirat Open University, Thailand

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Abstract

This research aimed to (1) investigate technology usage behaviors for enhancing student learning within the Bangkok Metropolitan Administration (BMA) and (2) examine teachers' perceptions of technology utilization in instructional activities. The population included 13,331 BMA teachers and 127,854 upper elementary and lower secondary students. The sample comprised 52 teachers and 332 students. Data were collected over four months through a coaching process where teachers designed activities using Google Classroom, with coaches observing and providing feedback. Instruments included the Google Classroom system and questionnaires on students' technology experiences and teachers' opinions on Google Solutions (GS). Findings revealed that 34.04% of students frequently used technology for learning, favoring desktop computers (49.10%) and educational games (53.92%). Students most often used technology 1–2 times per week outside class (28.01%) and perceived technology as beneficial in practical contexts (52.41%). Desktop computers were primarily used in class (54.51%), while smartphones were preferred for out-of-class learning (59.33%). YouTube was the most used tool (60.54%), followed by Gmail and Google Search. Students also recognized meaningful teacher feedback (mean = 4.05, SD = 1.01). Most teachers reported GS saved time in grading, teaching, administration, consultation, and lesson planning, with 44.85% saving 1-5 hours weekly. Teachers strongly agreed GS helped students access information (mean = 4.38, SD = 0.60) and increased student engagement and enthusiasm (mean = 4.38, SD = 0.77). This study highlights the positive impact of integrating Google Solutions in enhancing teaching and learning within BMA schools.

Keywords: coaching process for teachers, technology integration, enhancing learning, teaching management

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Introduction

The Bangkok Metropolitan Administration (BMA) is a special form of local government possessing autonomy in managing basic education under the supervision of the Office of Education. As of 2025, there are 437 schools under the BMA, with more than 14,000 teachers and educational personnel, and over 250,000 students enrolled across early childhood, primary, and secondary levels throughout the 50 districts of Bangkok (Bangkok Metropolitan Administration, Office of Education, 2025). Schools under the BMA are characterized by distinctive urban educational contexts that reflect the diversity of Bangkok's socioeconomic and cultural landscape, together with spatial limitations and disparities in educational resources. Consequently, educational administration within the BMA must operate amid a complex and rapidly changing environment to address the dynamic needs of urban citizens in the digital era. The continuous development of BMA schools to meet international educational standards therefore requires the integration of digital technology into learning processes, school management, and teacher professional development.

Recently, the Bangkok Metropolitan Administration (BMA) has launched the "Digital School Development Policy" to promote the integration of digital technologies into school management and classroom instruction. Teachers are encouraged to utilize tools such as Google Classroom, Google Drive, Google Forms, and YouTube to support lesson management and reduce administrative workloads. Research by Changkham and Chaemchoi (2023) revealed that most BMA teachers possess moderate levels of digital literacy, indicating a need for further development in technology-based instructional innovation. Similarly, Bungsri and Silanookit (2023) emphasized the crucial role of school administrators in fostering the effective use of information technology for teaching and learning within BMA schools. In the same vein, Mankhong and Detbumrung (2024) proposed strategic guidelines for information technology administration within the Bangkapi school cluster to ensure efficient and sustainable use of digital resources. These studies collectively underscore that the integration of technology into Bangkok's educational system is not merely optional but essential, aligning with the overarching goals of modern education in the digital era.

However, the advancement of instructional technology can only be effective when teachers are supported by a sustainable professional learning system that enables continuous self-development. The Coaching Process serves as a key mechanism to enhance teachers' competencies, empowering them to design learning experiences that meet the needs of digital-age learners. Naudom and Niyamajan (2024) indicated that coaching fosters collaborative learning among teachers through reflection, critical questioning, and the cultivation of academic leadership within schools. Therefore, this study aims to (1) investigate students' technology usage behaviors for enhancing learning within schools under the Bangkok Metropolitan Administration, and (2) examine teachers' perceptions and attitudes toward the utilization of technology in instructional activities. The findings are expected to provide insights and directions for enhancing the quality of both teachers and students in Bangkok's education system through the systematic integration of educational technology and the coaching process.

The Role of Google Tools in Education

At present, one of the most widely adopted digital platforms in educational institutions is Google Workspace for Education, which comprises a variety of tools such as Google Classroom, Google Drive, Google Docs, Google Forms, Google Slides, Gmail, and YouTube. These tools support both teaching and administrative tasks, providing an effective online

learning environment that connects all stakeholders teachers, students, parents, and administrators enabling seamless collaboration and communication within the school ecosystem (Ministry of Education, 2025).

Google Classroom is a Learning Management System (LMS) developed by Google to facilitate online classroom creation, course organization, assignment distribution and collection, as well as paperless grading and feedback. It enables teachers to manage classes efficiently and serves as an effective medium of communication between teachers and students in an online learning environment (Chaiyasat, 2022). Furthermore, research has shown that teachers are able to provide more individualized attention to their students through Google Classroom, as the system systematically compiles student work and learning data in one centralized platform (Deep et al., 2025).

Google Drive is a cloud-based storage platform that allows teachers and students to access teaching materials, lesson documents, and learning resources anytime and anywhere. Google Docs, an online word-processing application, enables multiple users to collaborate on the same document in real time. Students can easily work in groups, co-write reports, or develop projects together through Docs, while teachers can review and provide instant feedback online. This collaborative feature promotes cooperative learning and enhances students' teamwork skills.

Google Forms is an online tool for creating surveys, quizzes, and assessment forms. Teachers can use Forms to design online tests or evaluations, where the system automatically checks responses and provides scores, significantly reducing teachers' grading workload. Additionally, Google Forms facilitates efficient and systematic data collection from students and parents, enabling quick analysis and feedback.

Google Slides functions as an online presentation tool similar to PowerPoint but features real-time collaboration capabilities. Students can collaboratively design and create presentation slides from any location, while teachers can monitor progress, offer guidance, and provide immediate feedback. The use of Slides fosters students' creativity by enabling them to design multimedia presentations that integrate text, images, videos, and other media.

In the educational context, Gmail serves as a formal communication channel among teachers, students, and parents. Teachers can quickly send announcements, reminders, or assignments via email, while students can contact teachers for inquiries or submit assignments directly. Moreover, Gmail is seamlessly integrated with other Google Workspace tools, such as Google Classroom and Google Calendar, facilitating smooth and efficient communication across the school's digital ecosystem.

YouTube is an online video-sharing platform widely used by teachers and students for accessing various educational resources. Teachers can create and upload instructional videos for students to review anytime, or they may select high-quality educational content available on YouTube to supplement lessons. Using video-based media enhances student engagement, diversifies learning materials, and simplifies complex concepts. Furthermore, YouTube supports self-paced learning, allowing students to revisit videos as needed aligning with the principles of personalized learning and lifelong learning in the digital era.

Reducing Teachers' Workload Through Digital Platforms

Digital technology not only enhances teaching and learning but also plays a crucial role in reducing teachers' administrative workload. In the past, teachers spent a significant amount of time on clerical tasks such as distributing and collecting assignments, grading papers, recording scores, and sending emails for coordination. The adoption of online platforms has streamlined these processes, significantly reducing the time and effort required for such tasks.

For instance, using shared folders on Google Drive instead of sending individual email attachments allows teachers to upload instructional materials or worksheets in one centralized location, enabling students to access and submit their work instantly. This eliminates the need for teachers to send emails one by one (Lin, 2025). Furthermore, preparing lesson plans or instructional documents on Google Docs or Drive and updating them from existing templates saves considerable time compared to rewriting lesson materials from scratch each semester.

Moreover, Google Classroom significantly reduces teachers' paperwork. All tasks from assignment submissions and grading to providing feedback are stored digitally, making them easier to track and minimizing paper usage. Overall, studies have reported that the adoption of such online classroom management systems enables teachers to manage their time more efficiently and reduces stress caused by repetitive administrative tasks.

The Thai Ministry of Education and several educational agencies have also recognized the potential of technology to alleviate teachers' workload. For instance, the collaboration between the Ministry of Education and Google for Education promotes the use of Chromebooks and digital platforms in schools. One of its primary goals is to "enhance learning efficiency and enjoyment while reducing teachers' workload in classroom management" (Ministry of Education, 2025). Results from pilot projects in special education schools demonstrated that the use of digital tools allowed teachers to manage classes more flexibly, engage students more actively, and spend less time on post-class paperwork. All these findings illustrate that the effective application of educational technology enables teachers to focus more on teaching and supporting students, rather than being burdened by administrative or non-instructional duties.

Related Research

Online learning platforms have been shown to increase student engagement through more interactive and flexible learning formats. For example, live video lessons and real-time online activities conducted via Google Classroom or Zoom enable students to interact, ask questions, and collaborate with teachers and peers even in remote settings (Deep et al., 2025). Several studies have reported that students demonstrate higher concentration and motivation when digital media or game-based learning is incorporated into instruction. Furthermore, research in Thailand by Khuntong (2023) found that teaching through Google Classroom significantly enhanced students' interest and learning motivation, indicating that learner engagement is heightened when learning occurs through diverse digital media and interactive online activities.

Digital technology has made collaborative learning more accessible and convenient for students through various tools and platforms, such as discussion forums, group projects on Google Docs and Google Slides, or online community platforms that allow for idea sharing and peer interaction. A higher education study by Gupta and Pathania (2021) revealed that

pre-service teachers learning through Google Classroom felt more comfortable collaborating in groups and experienced a stronger sense of classroom community compared to traditional learning environments. Collaboration through online tools enables students to learn from their peers, support one another, and develop interpersonal communication skills simultaneously. Moreover, digital learning environments provide opportunities for shy or less confident students who may hesitate to express themselves in traditional classrooms to participate by posting comments or co-editing online projects. This inclusive approach fosters engagement from all learners, ensuring that every student has a voice in the learning process.

Digital media and online platforms have opened up new spaces for creative expression among learners. Tools such as Google Slides, Canva, and even YouTube video production allow students to showcase their imagination and innovative ideas in diverse formats. A systematic literature review by Pikhart, Al-Obaydi, and Klimova (2024) revealed that digital learning has a positive impact on students' creativity. Activities such as game-based learning, interactive technologies, digital storytelling, and collaborative learning environments were all found to significantly enhance creative thinking among learners. Furthermore, assigning students to create projects or multimedia presentations through online platforms helps them practice out-of-the-box thinking, develop flexible problem-solving skills, and gain the confidence to present their work in diverse and innovative formats. These approaches highlight the role of digital platforms not only as tools for information delivery but also as catalysts for creativity, innovation, and student empowerment in the learning process.

Personalized learning allows flexibility in education by tailoring learning experiences to meet individual learners' needs. Digital platforms support this by enabling students to set their own learning pace through on-demand access to instructional media and recorded lessons. This flexibility ensures that both fast and slow learners can learn at their full potential. Moreover, teachers can use online tools to track students' progress individually and provide personalized feedback or supplementary exercises to those who need additional support.

Research has shown that both students and teachers agree that Google Classroom is user-friendly and "requires less effort compared to other platforms," allowing teachers to spend more time focusing on each student's learning needs. This leads to a more productive and responsive learning environment (Deep et al., 2025). Additionally, some modern platforms particularly AI-powered learning systems are capable of analyzing learner data to automatically adjust lesson content or practice activities according to each student's ability level and interests. This innovation bridges the gap left by traditional "one-size-fits-all" teaching approaches, helping ensure that every learner has an equitable opportunity to succeed in their educational journey.

The digital transformation in education represents both a challenge and an opportunity for the academic community. Research conducted over the past five years, both in Thailand and abroad, clearly demonstrates that digital technologies and online platforms can enhance teaching effectiveness and learning outcomes when appropriately implemented. Tools such as Google Classroom, Drive, Docs, Forms, Slides, Gmail, and YouTube have proven instrumental in reducing teachers' administrative workload while fostering collaborative, creative, and flexible learning environments that align with each learner's potential. The reviewed studies collectively affirm that the "digital transformation of education" is not merely about adopting new tools it is about creating new opportunities for both teachers and students to realize their full potential in the evolving world of future learning.

Methodology

The study entitled "Integrating Technology to Promote Learning and Teaching Management Through the Coaching Process for Teachers in Bangkok Metropolitan Administration" was implemented through a systematic series of steps designed to ensure accuracy, reliability, and practical applicability. The procedures were structured as follows:

Coaching Orientation and Initial Consultation

The research process commenced with an orientation session, during which the coach provided participating teachers with guidance and consultation on the development of lesson plans that integrate digital technologies into classroom practices. The session also included follow-up discussions on instructional design and classroom management through the use of Google Classroom.

Design and Development of Online Learning Modules

Based on the coach's recommendations, each teacher developed three online learning modules using Google Classroom. Each module included the following components: (1) a module title, (2) learning objectives, (3) instructional procedures, and (4) rubric-based assessments aligned with 21st-century learning skills. Additionally, each lesson incorporated a four-option multiple-choice test to assess student learning achievement.

Weekly Coaching Sessions and Reflective Practice

The coach facilitated weekly online meetings with the participating teachers two hours per session, for a total of 16 sessions over a four-month period. These sessions focused on collaborative reflection, encouragement, and problem-solving related to technology integration in teaching and learning. Teachers were also encouraged to exchange their experiences and share best practices to strengthen their instructional design and delivery.

Classroom Observation and Performance Evaluation

Each teacher was observed twice by the coach during live classroom instruction. The observations employed the Teacher Learning Management Behavior Assessment Form for BMA Teachers, based on rubric criteria. Evidence was collected from both in-class teaching and online instruction via Google Classroom. Observation logs were documented, including targeted feedback and specific recommendations for improvement.

Support for Innovation Presentation

During weeks 13–16, the coach provided additional mentoring and technical support to help teachers prepare their work for submission to a teaching innovation contest. This phase emphasized the application of technological integration in learning management. Teachers refined their work by applying insights gained from reflective practices, peer learning, and coaching feedback accumulated throughout the program.

Data Collection From Students and Teachers

To evaluate the impact of the intervention, data were collected from both students and teachers. Students completed a questionnaire on their experiences with technology-supported learning, while teachers responded to an assessment form measuring their use of digital tools in instructional practices.

The instruments used in this study included two questionnaires: one on students' experiences with technology, and another on teachers' opinions toward Google Solutions (GS) after completing the coaching and instructional activities.

Population

The study's population consisted of 13,331 teachers teaching at the primary and lower secondary levels under the Office of Education, Bangkok Metropolitan Administration (BMA), according to the official website of the BMA Office of Education for the academic year 2023.

Sample Group

The sample included 332 students and 56 teachers who taught Primary Grades 2, 4, and 6, and Lower Secondary Grades 7 and 8 (Matthayom 1–2) in schools under the BMA Office of Education. The participants were selected through purposive sampling, consisting of teachers who voluntarily participated and demonstrated the ability to use technology in their instructional practices.

Data Analysis

The collected data were analyzed using frequency, percentage, mean, and standard deviation to interpret the results from both the student and teacher questionnaires.

Results

Table 1
Students' Background Information and Technology Usage Behaviors After Participating in the Program (n = 332)

Background Information of Students		N	Percentage
Gender	1) Male	149	44.88
	2) Female	183	55.12
Frequency of Technology Use for Learning after Participation			
	1) Very rarely	9	2.71
	2) Rarely	17	5.12
	3) Moderately	98	29.52
	4) Often	95	28.61
	5) Very often	113	34.04
Preferred Devices for Learning Activities			
	1) Chromebook	1	0.30
	2) Laptop	17	5.12
	3) Desktop computer	163	49.10
	4) Android smartphone	65	19.58
	5) iPhone	50	15.06

Background Information of Students	N	Percentage
6) Android tablet	11	3.31
7) iPad	25	7.53
Most Preferred Subject		
1) Mathematics	25	7.53
2) Science	26	7.83
3) Computer/ICT	78	23.49
4) Social Studies	16	4.82
5) Thai Language	29	8.73
6) English	35	10.54
7) Arts and Music	70	21.09
8) Occupation and Technology	10	3.01
9) Guidance and Student Development Activities	14	4.22
10) Others (e.g., Health Education, Physical Education)	29	8.74
Preferred Learning Activities (multiple responses allowed)		
1) Listening to lectures	121	36.45
2) Inquiry-based learning	96	28.92
3) Project-based learning	90	27.11
4) Practice and experimentation	152	45.78
5) Story-based learning	86	25.90
6) Field study/learning resources	120	36.14
7) Problem-based learning (teacher-assigned scenarios)	81	24.40
8) Educational games	179	53.92
Level of Preference for Using Technology in Learning		
1) Very low	7	2.11
2) Low	22	6.62
3) Moderate	105	31.63
4) High	83	25.00
5) Very high	115	34.64
Frequency of Technology Use for Learning (in class)		
1) Never	15	4.52
2) 1–2 times per month	55	16.56
3) 1–2 times per week	117	35.24
4) 3 or more times per week	78	23.50
5) Every day	67	20.18
Frequency of Technology Use for Learning (outside class)		
1) Never	26	7.82
2) 1–2 times per month	65	19.58
3) 1–2 times per week	93	28.01
4) 3 or more times per week	77	23.20
5) Every day	71	21.39
Students' Attitudes toward Using Technology in Classroom Learning		
Technology causes harm	17	5.12
No benefit from technology	26	7.83
Indifferent toward technology	20	6.02
Technology is useful but has obstacles	95	28.62
Technology is beneficial and I try to use it when possible	174	52.41
Devices Frequently Used for Learning in Class (multiple responses allowed)		
1) Chromebook	12	3.61
2) Smartphone	133	40.06
3) Tablet	56	16.87
4) Laptop	45	13.55
5) Desktop computer	181	54.51
6) Others	0	0

Background Information of Students	N	Percentage
Devices Frequently Used for Learning outside Class (multiple responses allowed)		
1) Chromebook	17	5.12
2) Smartphone	197	59.33
3) Tablet	74	22.29
4) Laptop	51	15.36
5) Personal computer	79	23.8
6) Others	0	0

From the survey results, it was found that the majority of students were female (183 students, 55.12%). After participating in the instructional activities, students reported the highest frequency of technology use for learning at the “very often” level (113 students, 34.04%), followed by “moderate” (98 students, 29.52%) and “often” (95 students, 28.61%). Regarding preferred devices, students most frequently engaged in learning activities using desktop computers (163 students, 49.10%), followed by Android smartphones (65 students, 19.58%) and iPhones (50 students, 15.06%). The most preferred subject was Computer/ICT (78 students, 23.49%), followed by Arts and Music (70 students, 21.09%) and English (35 students, 10.54%). For preferred learning activities (multiple responses allowed), educational games were ranked highest (179 students, 53.92%), followed by practice and experimentation (152 students, 45.78%) and listening to lectures (121 students, 36.45%). In terms of preference for technology use in learning, the largest proportion of students reported the “very high” level (115 students, 34.64%). With respect to frequency of technology use, students most often reported using technology for in-class learning 1–2 times per week (117 students, 35.24%), while for out-of-class learning, the highest frequency was also 1–2 times per week (93 students, 28.01%). In terms of attitudes, the majority of students agreed that technology is beneficial and attempted to use it in applicable contexts (174 students, 52.41%). For devices used regularly in class, desktop computers were most common (181 students, 54.51%), followed by smartphones (133 students, 40.06%) and tablets (56 students, 16.87%). In contrast, for out-of-class learning, students primarily used smartphones (197 students, 59.33%), followed by personal computers (79 students, 23.80%) and tablets (74 students, 22.29%).

From the analysis of students’ opinions, several key factors influencing the choice of digital devices for learning were identified. Students reported that these devices enhanced learning engagement, making them feel more knowledgeable, entertained, and actively involved. In addition, the devices were valued for their convenience, portability, and sufficiently large screen size that ensured comfortable use. Some students also highlighted that digital devices improved learning efficiency, information retrieval, and task performance. Moreover, a portion of students indicated that their device choice was influenced by availability through school provisions or support from computer laboratories, which facilitated smoother access and usage.

Table 2
Students' Attitudes and Experiences Toward the Use of Technology in Classroom Learning (n = 332)

Tools Used by Students for Classroom Learning	Levels of Students' Attitudes and Experiences Toward the Use of Technology in Classroom Learning									
	Not comfortable at all, would not try		Uncomfortable, but would try		Comfortable, able to use		Very confident, familiar with all tools		Highly confident, well-trained	
	n	%	n	%	n	%	n	%	n	%
Google Solutions (GS)	13	3.91	31	9.34	164	49.40	50	15.06	74	22.29
Chromebook	49	14.76	45	13.55	151	45.48	37	11.14	50	15.06
Google Classroom	17	5.12	41	12.35	90	27.11	63	18.98	121	36.45
Google Drive	29	8.73	78	23.49	94	28.31	53	15.96	78	23.49
Google Documents	23	6.93	76	22.89	111	33.43	68	20.48	54	16.27
Google Sheets	39	11.75	69	20.78	76	22.89	48	14.46	100	30.12
Google Forms	21	6.33	60	18.07	91	27.41	51	15.36	109	32.83
Google Slides	17	5.12	58	17.47	106	31.93	45	13.55	106	31.93
Google Search	15	4.52	54	16.27	79	23.80	52	15.66	132	39.76
Gmail	14	4.22	36	10.84	81	24.40	58	17.47	143	43.07
Calendar	44	13.25	62	18.67	85	25.60	75	22.59	66	19.88
YouTube	9	2.71	17	5.12	65	19.58	40	12.05	201	60.54
Google Maps	26	7.83	37	11.14	88	26.51	63	18.98	118	35.54

From the table 2, it was found that students felt comfortable using digital tools for classroom learning. Students reported being highly confident and well-trained in tools familiar to their daily lives, more so than in specialized tools. The most frequently cited tool was YouTube (201 students, 60.54%), followed by Gmail (143 students, 43.07%) and Google Search (132 students, 39.76%). In contrast, tools such as Chromebook, Google Docs, and Google Calendar were used by a relatively smaller proportion of students. This reflects the need for additional training and promotion of these tools in order to enhance students' confidence and convenience in their use.

Table 3
Students' Perceptions of Comfort in Using Google Solutions (GS) for Classroom (n = 332)

Students' Perceptions of Comfort in Using Google Solutions (GS) for Classroom Learning		
No participation at all	10	3.00
Slight participation	36	10.80
Moderate participation	110	33.10
High participation	76	22.90
Very high participation	100	30.10

The findings revealed that most students reported moderate to very high participation when using Google Solutions (GS) for classroom learning, with 33.10% indicating moderate participation, 22.90% high participation, and 30.10% very high participation. In contrast, only a small proportion of students expressed little or no participation (10.80% and 3.00%, respectively). These results suggest that GS effectively encouraged student engagement in classroom activities, supporting its role as a practical tool for enhancing active learning.

Table 4
Students' Attitudes and Experiences Toward the Use of Technology in Classroom Learning: Questions on Timetables and the Outcomes of Using Google Solutions (GS) (n = 332)

Students' Attitudes and Experiences Toward the Use of Technology in Classroom Learning	Mean	SD	Level of Agreement
1. I was able to manage all of my own tasks more effectively.	3.76	0.96	Agree
2. I was able to better identify my specific needs.	3.75	0.92	Agree
3. The instructor provided feedback that was meaningful and significant to my work.	4.05	1.01	Agree
4. I was able to better learn the fundamental content.	3.89	0.93	Agree
5. I was more deeply engaged with the subject content.	3.88	0.96	Agree
6. I participated and became more enthusiastic.	3.74	1.03	Agree
7. I gained a better understanding of my own capabilities through the use of Google Solutions (GS).	3.81	1.07	Agree
8. I was able to communicate more effectively with others involved in my learning.	3.79	1.00	Agree
9. The use of Chromebook or desktop computers effectively met my learning needs.	3.81	1.04	Agree

From the table 4, it was found that the majority of students agreed most strongly that instructors provided feedback that was meaningful and significant to their work, with the highest mean score of 4.05 and a standard deviation of 1.01. The next highest items were that technology helped students better learn fundamental content (mean = 3.89, SD = 0.93) and become more deeply engaged with the subject content (mean = 3.88, SD = 0.96).

Table 5
Students' Technology Usage and Device Preferences for Learning With Google Solutions (n = 332)

Technology Usage and Device Preferences for Learning With Google Solutions	n	%
Students' Comfort in Using Google Solutions (GS) for Classroom Learning		
No participation at all	10	3.01
Slight participation	36	10.84
Moderate participation	110	33.13
High participation	76	22.89
Very high participation	100	30.12
Time Spent on Online Activities during Class (hours per day)		
1) 1–2 hours	155	46.69
2) 2–4 hours	83	25.00
3) 4–6 hours	76	22.89
4) 6–8 hours	8	2.41
5) More than 8 hours	10	3.01
Time Spent on Online Activities outside Class (hours per day)		
1) 1–2 hours	150	45.18
2) 2–4 hours	78	23.49
3) 4–6 hours	59	17.77
4) 6–8 hours	26	7.83
5) More than 8 hours	19	5.72

Technology Usage and Device Preferences for Learning With Google Solutions	n	%
Devices Used by Students to Complete Teacher-Assigned Tasks		
1) Chromebook	12	3.61
2) School computer	179	53.92
3) Personal computer/laptop	31	9.34
4) Personal tablet	17	5.12
5) Personal smartphone	69	20.78
6) Rarely used:	24	7.23

From the table 5, it was found that students were most comfortable using Google Solutions (GS) for classroom learning at the "moderate participation" level (110 students, 33.13%), followed by "very high participation" (100 students, 30.12%). Most students spent 1–2 hours per day on online activities during class (155 students, 46.69%) and similarly 1–2 hours per day on online activities outside class (150 students, 45.18%). In completing teacher-assigned tasks, the majority of students relied on school computers (179 students, 53.92%), followed by personal smartphones (69 students, 20.78%) and personal computers/laptops (31 students, 9.34%).

In addition, students' opinions regarding instruction supported by technology were generally positive. Many students reported that the lessons were enjoyable and exciting, reflecting increased engagement as well as emphasizing clarity and knowledge acquisition, particularly in technology-related aspects. Students also valued the convenience and modernity of using technology in the classroom. At the same time, some comments highlighted the role of teachers as highly supportive and kind instructors, which demonstrated positive teacher–student relationships in the context of technology-enhanced learning.

Table 6
Average Weekly Hours Teachers Spend on Various Professional Activities (OECD Data)

Activities	Average Weekly Hours (OECD)
Teaching	19
Lesson planning or preparing instructional materials	7
Correcting student work	5
General administration (communication, paperwork)	3
Teamwork and discussions with colleagues	3
Providing student guidance/counseling	2.1
Conducting extracurricular activities (clubs, sports)	2.1
Communication and collaboration with parents/guardians	1.5
School management tasks (e.g., department head responsibilities)	1.5
Other (e.g., supervising students during breaks, peer consultation, collaborative projects, professional development)	1.5

According to OECD data, teachers spend the largest portion of their weekly working hours on teaching (19 hours), followed by lesson planning or preparing instructional materials (7 hours) and correcting student work (5 hours). Considerably less time is devoted to general administration and teamwork with colleagues (3 hours each). Activities such as providing student guidance or counseling (2.1 hours), conducting extracurricular activities (2.1 hours), and communication with parents (1.5 hours) take even fewer hours. Similarly, school

management responsibilities and other duties such as supervision, peer consultation, and professional development also average only 1.5 hours per week. Overall, the findings highlight that direct teaching and lesson preparation occupy the majority of teachers' time, while administrative, extracurricular, and management-related tasks require significantly fewer hours.

Table 7

Effects of Using Google Solutions (GS) on Teachers' Working Time After Participating in the Project

Effects of Using Google Solutions (GS) on Teachers' Working Time	Reduced my personal time		No effect		Helped save time	
	n	%	n	%	n	%
Teaching	7	13.46	9	17.31	36	69.23
Lesson planning or preparing instructional materials	11	21.15	12	23.08	29	55.77
Correcting student work	3	5.77	6	11.54	43	82.69
General administration (communication, paperwork)	5	9.62	13	25.00	34	65.38
Teamwork and discussions with colleagues	2	3.85	24	46.15	26	50.00
Providing student guidance/counseling	2	3.85	18	34.62	32	61.54
Conducting extracurricular activities (clubs, sports)	3	5.77	24	46.15	25	48.08
Communication and collaboration with parents/guardians	3	5.77	25	48.08	24	46.15
School management tasks (e.g., department head responsibilities)	3	5.77	21	40.38	28	53.85
Other (e.g., supervising students during breaks, peer consultation, collaborative projects, professional development)	5	9.62	18	34.62	29	55.77

After participating in the project) Overall, did the use of Google Solutions (GS) help save your time in performing main activities?	n	%
1) No, the use of Google Solutions (GS) increased my workload and did not help save time	4	7.69
2) The use of Google Solutions (GS) had no effect on my time	5	9.61
3 The use of Google Solutions (GS) helped save a little time (less than 1 hour per week)	15	28.85
4) The use of Google Solutions (GS) helped save considerable time (1–5 hours per week)	23	44.23
5) The use of Google Solutions (GS) helped save a great deal of time (more than 5 hours per week)	5	9.62

From the table 7, it was found that the majority of teachers agreed that the use of Google Solutions (GS) helped save time in the following tasks: correcting student work (43 teachers, 82.69%), teaching (36 teachers, 69.23%), general administration such as communication and paperwork (34 teachers, 65.38%), providing student guidance (32 teachers, 61.54%), lesson planning or preparing instructional materials (29 teachers, 55.77%), and other activities such as supervising during breaks, peer consultation, and professional development (29 teachers, 55.77%). Furthermore, most teachers reported that the use of GS helped save considerable time, particularly between 1–5 hours per week (23 teachers, 44.85%).

Table 8
Teachers' and Students' Perceptions of the Effects of Using Google Solutions (GS) on Learning and Teaching

List	Mean	SD	Level of Agreement
Effects of Using Google Solutions (GS) on Learning and Teaching			
GS provided opportunities for students to use creativity and imagination in their work.	4.31	0.73	Strongly agree
GS helped students present ideas and express opinions more effectively.	4.25	0.62	Strongly agree
GS enabled students to seek knowledge and search for relevant information to support their learning.	4.38	0.60	Strongly agree
GS supported greater student collaboration.	4.04	0.84	Agree
GS encouraged more student communication.	3.96	0.86	Agree
GS increased students' confidence in actively participating in classroom activities.	4.31	0.67	Strongly agree
GS enabled students to learn more effectively.	4.21	0.61	Strongly agree
GS helped improve students' skills, particularly reading and writing.	3.90	0.89	Agree
GS enhanced students' potential, especially in STEM subjects (Science, Technology, Engineering, and Mathematics).	4.21	0.75	Strongly agree
GS contributed to better student behavior.	3.63	1.01	Agree
Average	4.12	0.76	Agree
Effects on Teaching			
Teachers were able to manage classroom tasks more effectively.	4.06	0.87	Agree
Teachers were better able to identify the specific needs of each student.	3.94	0.80	Agree
Teachers provided more meaningful and significant feedback on students' work.	4.08	0.71	Agree
Teachers were able to teach fundamental content more effectively.	4.10	0.75	Agree
Students engaged more deeply with the subject content.	4.17	0.71	Agree
Students participated more actively and enthusiastically in learning.	4.38	0.77	Strongly agree
Teachers gained a better understanding of each student's capabilities through the use of GS.	4.15	0.72	Agree
Teachers communicated more effectively with stakeholders (parents, other teachers, and staff).	3.87	0.79	Agree
Average	4.09	0.77	Agree

From the table 8, it was found that teachers agreed on average that Google Solutions (GS) positively affected student learning (M = 4.12, SD = 0.76). In detail, the highest-rated item was that GS enabled students to seek knowledge and search for relevant information to support their learning, rated at the level of *strongly agree* (M = 4.38, SD = 0.60). This was followed by two items also rated at the *strongly agree* level: GS provided opportunities for students to use creativity and imagination in their work (M = 4.31, SD = 0.73), and GS increased students' confidence in actively participating in classroom activities (M = 4.31, SD = 0.60).

Furthermore, after using Google Solutions (GS), teachers also agreed on average that GS had a positive effect on their instructional practices (M = 4.09, SD = 0.77). In particular, the highest-rated item was that students participated more actively and enthusiastically in learning, rated at the *strongly agree* level (M = 4.38, SD = 0.77). The next highest items were that students engaged more deeply with the subject content (M = 4.17, SD = 0.71) and that teachers gained a better understanding of each student's capabilities (M = 4.15, SD = 0.72), both rated at the *agree* level.

Discussion

The results clearly demonstrate that Google Solutions (GS) played a vital role in improving both teaching and learning efficiency within Bangkok Metropolitan Administration (BMA) schools. Teachers reported that GS tools such as Google Classroom, Drive, and Forms significantly reduced their workload, particularly in grading and lesson preparation, allowing them to focus more on meaningful teaching interactions, consistent with Lin (2025) and Deep et al. (2025). Students also showed higher engagement, motivation, and creativity when using GS, supporting Khuntong's (2023) and Gupta and Pathania's (2021) findings that digital learning environments enhance participation and collaboration. Moreover, the integration of multimedia tools like YouTube encouraged active and self-directed learning, aligning with Pikhart, Al-Obaydi, and Klimova's (2024) view that digital platforms stimulate creativity and innovation. Altogether, the evidence suggests that when technology integration is supported through structured coaching, it not only streamlines teachers' tasks but also cultivates a more interactive, creative, and student-centered learning culture, an essential foundation for sustainable digital education in the 21st century.

Conclusion

In conclusion, this study confirms that the integration of Google Solutions (GS) through the coaching process effectively enhanced both teaching management and student learning within Bangkok Metropolitan Administration (BMA) schools. The use of GS tools, particularly Google Classroom, Drive, Forms, and YouTube, helped teachers reduce administrative workload, improve instructional efficiency, and provide more meaningful feedback to students. At the same time, students demonstrated greater engagement, creativity, and confidence in using technology for learning. These outcomes align with the BMA's digital transformation goals and previous research emphasizing that well-supported technology integration can transform classroom practices. Overall, the findings highlight that combining digital tools with continuous professional coaching creates a powerful model for fostering active, innovative, and sustainable learning environments in the digital era.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that ChatGPT and Gemini were used solely for language proofreading, including grammar checking and improving clarity of expression. These tools were not used to generate any academic content. All content presented in this manuscript, including data collection, analysis, and synthesis, was conducted independently and systematically by the author.

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