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Teachers' Attitudes to Use of Advanced Technological Tools as Teaching and Learning Aids: From an Inter-Generational Perspective

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Abstract: This study examines the perceptions and attitudes of teachers towards tablets as pedagogical aids from an inter-generational perspective. It is based on sociological theories and definitions that emphasize the disparities and the uniqueness of each "generation" as well as customary teaching and learning methods. The study compares teachers from Generation Y and Generation X and it was carried out about one year from the beginning of the COVID-19 pandemic, when all teachers regardless of "generation" were required to teach digitally. We focused on a common digital tool, the tablet, which enables diverse learning methods. A questionnaire was administered to teachers in the Israeli educational system (N = 154). The research findings showed that teachers from Generation Y (aged 26-42) have more positive general attitudes towards the use of tablets as an integral part of the study program and identify more advantages and less disadvantages than their Generation X colleagues (ages 43-65). The current research findings were compatible with research findings regarding the general attitudes of teachers towards innovative technologies and their integration in study programs in educational systems worldwide. The practical meaning of the study is that it is important to continue leading programs for integrating advanced technological appliances, and not only tablets, in the curriculum, as the generation of teachers who will be responsible for educating the younger generations and for leading these programs in particular is from the age group that has the most positive attitudes towards the subject.

Keywords: *Educational System, Generation X, Generation Y, "Smart" Cellular Technology, Use of Tablets, Teacher Attitudes*.

Research Literature

The global COVID-19 pandemic changed the life of many in various areas, including teaching, learning, and work (Business as unusual, 2020). Teachers were compelled to deal with "responding" to constraints. Although the transition to the online format was not without problems, 71% of parents in the study conducted by McCrindle and Fell (2020) ranked it as a positive experience. It may be assumed that in the post-pandemic world as well, e-learning technologies will apply competitive pressures on the various educational institutions. For this purpose, it is necessary to train teachers to use digital tools and new infrastructure (UNESCO, 2020). The second decade of the 21st century was characterized to a great extent by the emergence and development of "smart" cellular technologies in general and use of tablets in particular. This latter technology was identified as having considerable potential for the educational system and was integrated in classrooms as a pedagogical aid, where the discourse on the topic ranged from the advantages of the tablet for teachers and students and its disadvantages.

The proposed study seeks to examine the attitudes of teachers to digital teaching, in an intergenerational comparison (Almog & Almog, 2016). Generation X is not characterized by a tendency to rebel against social conventions and to reject authority. This generation does not want to change the world or transform it in any way (Garcia Perez, Gil Mediavilla, Álvarez, & Casares, 2020). In contrast, Generation Y is a permissive, equitable, humoristic, supportive, open, and flexible generation. The pandemic was a catalyst for use of technology. Teachers had to contend with e-

teaching all at once, which was particularly challenging considering that they do not perceive e-teaching and -learning as better than the face-to-face version (Davidovitch & Wadmany, 2021).

The current study examines the attitudes of teachers to use of tables, which is one of the most common devices (including laptops and tablets) (Anderson et al., 2003; Anderson, Anderson, VanDeGrift, Wolfman, & Yasuhara, 2004; Gill, 2007; Hulls, 2005; Mock, 2004). Tablets are now replacing laptops and PC computers to a large degree. The tablet screen enables both touch and interaction with a pen, which allows writing with a pen, adding an internet camera and software, the option of recording lessons and videos in advance, and even marking assignments quickly and efficiently (Joordens, 2020).

The Generational Divide

According to the research literature (Albert, Hurrelmann, Leven, Quenzel, & Schneekloth, 2019), the term "generation" can be defined in four ways:

Verbally: As referring to all individuals born and living in the same time period (or who share a similar temporary status during that time);

Temporally: The time period from the birth of parents to the birth of their offspring (customarily defined as 25 to 30 years, where the number increases the more developed and modern the society);

From a family perspective: One's place in the family lineage or in the civil-national lineage (where each family group constitutes a generation – grandparents, parents, children, grandchildren, etc.);

Socially-culturally (sociologically): A group of individuals born in a defined range of years, who share the same cultural events and experiences and are characterized by similar perceptions, approaches, challenges, and thinking and behavior patterns.

The most relevant definition for the current study is the fourth (the sociological and demographic "generation"), so references to the term in the rest of the study will follow this definition.

The perception of the generations as demographic, social, and cultural population groups began in 19th century Europe, with the rise and popular consciousness of the Enlightenment Movement and the concepts of modernization, humanism, industrialization, and nationalism (concurrent with the decline of traditional religious institutions). These economic and social changes led to a distinction between older people and the elderly, who had been brought up on early conventions and ideas, and younger people and children, whose process of maturation, identity formation, and joining society as contributing individuals occurred in light of these ideas. The fundamental differences between the young of those times (defined by contemporary intellectuals using terms such as "independence", "emancipation", and "teenage rebellion") and their parents (who were part of the world characterized by the old perceptions) reinforced the conception that these were population groups distinguished by more than only their years of birth. This led to the emergence of the sociological-demographic concept of generations, whereby the years that delimit each generation are defined by changes and transitions on the economic, social, cultural, and political level (Larrington, 2017).

Hungarian sociologist Karl Mannheim, one of the first and most conspicuous figures in the sociological-demographic research of generations, formulated his "theory of generations" in his well-known compilation "The Problem of Generations" in 1923. He contended that individuals and groups in a certain society are fundamentally and critically affected by the socio-historical environment of their youth, and particularly by notable events in which they took an active part. Based on the common experience, these events lead to generations of social groups or cohorts with shared statistical and/or demographic characteristics that subsequently affect the events that will shape the next cohorts, or indeed the next generations (Little & Winch, 2017).

Until Mannheim's time, a distribution into two schools of generation research was customary: the positivist school that measured social changes by defined periods of life (which Mannheim criticized, claiming that it renders history superficial, embodied by mere chronological tables); and the historical-romantic school that focused on the individual qualitative experience at the expense of the social context (of which Mannheim claimed that the high frequency of social change is critical for forming generations and that not every generation will know how to distinguish itself in light of its subjective experiences). Mannheim sought, in fact, to merge the two schools and to define generations by the constitutive events in their life in a way that combines both the year of birth and life and its subjective qualitative-individual experiences in light of the same events from a socio-historical respect (Larrington, 2017; Little & Winch, 2017).

Mannheim defines a generation (that is necessarily distinct from the previous generation) by three characteristics that are shared by all the individuals and groups that comprise it:
Temporal location: The year and place of their birth and life.
Historical location: The generation as exposure to a shared actuality and/or era.
Sociocultural location: The common consciousness, mind, and "active force" of the generation's characteristics (based on Aristotle's philosophy). Consequently, Mannheim was also the first to claim that certain generations might overlap, and that several "sub-generations" might exist within the same generation (Little & Winch, 2017).

Further on, those who sought to "leave their mark" on the research of generations were researchers William Strauss and Neil Howe. They contended, in what is called the Strauss-Howe generational theory, that the US and other industrialized modern western countries experience a recurring cycle of generations, where every few generations there emerges a generation whose basic characteristics are identical (or at least very similar) to those of the "first" generation in the cycle. Each such generation is characterized by four constitutive events that the researchers called "turnings": the "high", a post-crisis period when institutions are strong and individualism weak; the "awakening", a time when the institutions are under attack in the name of personal and spiritual autonomy; the "unraveling", a state that is almost the reverse of the "high", when the institutions are weak and shaky and individualism is strong and flourishing; and the "crisis", when the existing institutions are toppled and rebuilt in response to a perceived threat to the survival of the nation (the stage that in fact ends the current generations and leads to the "high" stage of the next generation).

In addition, the researchers argue for four types of generation that are defined according to the phase in which they were formed: the "prophet", formed towards the end of the "crisis"; the "nomad", formed during the "awakening"; the "hero", formed after the "awakening" and during the "unravelling"; and the "artist", formed after the "unravelling" and during the "crisis". Hence, Strauss and Howe argue for the existence of a recurring pattern of constitutive events in a given period of time, whereby the generations formed have common characteristics as the previous generations formed concurrent with similar events. In this manner, they claim that it is possible to foresee both the characteristics of the next generations and the types of events that will lead to their formation (Clark, 2019).

Generation X are also called the "lost children". They were born from 1965 to 1977 or 1980, as this is the first western generation around whose beginning and end (year-wise) there is no global academic or cultural consensus. This is a skeptical, pragmatic, and careful generation characterized by the highest level of education and the lowest voting rates until that time (namely, a search for knowledge side by side with a loss of trust in the political system and the political leadership). In addition, this generation is characterized by individualism and even a certain narcissism, a survival and independence instinct, and a wish to become separated from the established dependency on the government, national institutions, and large business corporations (Albert et al., 2019; Reisenwitz & Fowler, 2019; Ting, Lim, de Run, Koh, & Sahdan, 2018).

The following generation is Generation Y, also called the "millennials", the "9/11 generation", and the "echo boomers", whereby different sources define it as belonging to different years, such that it is possible to claim that these are individuals born from 1977 to 2004, although it may also be said that a generation cannot be defined as belonging to such a span of years, comparing the characteristics of people separated by 20 years or more. Generation Y is characterized by computer and internet literacy from a young age, at-risk youth due to violence and drugs, abandoning traditional conventions regarding marriage and divorce, and commercial and sociocultural preference for brands. Sometimes millennials are treated as a sub-generation of Generation Y, born from 1982-2004. According to this approach, the millennials within Generation Y are perceived as a generational population that spends lengthy spans of time on the internet, has difficulty maturing, needs positive reinforcement, finds it hard to delay gratifications, and is concentrated mainly on itself with regard to immediate emotional needs (ibid.).

Life experiences in different environments formed generations of workers who differ from each other. Members of Generation Y occupy more jobs at present than any other generation. According to data from the Pew Research Center, the number of Generation Y workers in the US has been rising constantly since 1995, and since the first quarter of 2015 they have become the largest group of workers in American firms. Seventy-eight percent of Generation Y use LinkedIn to find jobs, 20% more than the second most popular option: searching for a job through friends and family. Since this generation does not find it hard to use the most recent technology and leads in use of mobile devices (according to Nielsen, more than 97% of them have smartphones), use of websites that require frequent updates poses no problem for them. Social media is ranked third for job searches by Generation Y. People from Generation Y want

to feel that they are part of something that is bigger than them and considering their constant dependency on the internet these platforms grant them this opportunity.

Generation Y is not concerned of switching jobs. A study conducted by the Education Advisory Board (Albert et al., 2019; Reisenwitz & Fowler, 2019; Ting, Lim, de Run, Koh, & Sahdan, 2018) showed that people in Generation Y switch jobs up to 20 times during their career! This is significantly more than any other generation, and double that of people born during 1946-1960. People in Generation X also rely on the internet when searching for a job and switch jobs more frequently than previous generations. Nonetheless, Generation X workers have a 25% higher desire than representatives of Generation Y to know in advance what is expected of them before deciding to switch jobs.

Attitudes

Attitudes are a structured psychological concept with mental-cognitive and psychological-emotional roots and manifestations, which constitute an essential component of the individual's personality, existence, and perceptions. Characterizing an individual as having a certain attitude to a given object (human or inanimate, concrete, or abstract) is an acquired state based on the individual's life course and experiences, both on the factual objective level and on the interpretive subjective level. When an individual is defined as having a certain attitude towards a given object, this is manifested both cognitively (in how the individual perceives and thinks about the object, ascribes values to it, and sees it as having given characteristics and influences) and behaviorally (the individual's practical reactions to the object in light of the cognitive features of his or her attitude towards it) (Perloff, 2017).

With regard to the attitudes of teachers, Zilka (2011) suggested a more thorough and detailed definition and contended that these can be divided into three separate components, where each exists independently and in its own right and also has causal mutual relations with the others:

The cognitive component: relates to information possessed by the individual with regard to the object, including objective information (factual details that are proven and grounded in reality) and subjective information (the values, beliefs, thoughts, and perceptions that the individual attributes to the object, both based on the objective information and unrelated to it). The more positive the values, beliefs, thoughts, and perceptions the individual attributes to the object – it can be assumed that his attitude to the object will be more positive, and vice versa.

The behavioral component: The individual's explicit behavior towards the object and his tendency to perceive this behavior as commensurate with his desirable relationship with the object. This behavior is affected, as a rule, by the individual's past behavior, such that the tendency is to preserve the current behavior pattern in a way that reinforces the current attitude toward the object (and will probably continue to reinforce it in the future). Hence, it is possible to identify causal mutual relations between the attitude (which generates behavior) and the behavior (which preserves the attitude).

The emotional component: The individual's subjective feelings regarding the object, i.e., the sentimental-emotional relationship with it (unlike the logical relationship in light of cognitive thinking processes or the practical relationship manifested in behavior, as the three types are not necessarily consistent). This emotional relationship is usually expressed in general terms of attraction (positive emotional attitude) or rejection (negative emotional attitude). Similar to the behavioral component, the emotional component too has causal mutual relations with the attitude itself, as on one hand the attitude towards an object might have a significant influence on the emotional relationship with it and on the other a predetermined emotional relationship with the object (for instance due to external factors that are not in the individual's control) might determine the attitude towards it to a large degree.

Use of Tablets in The Educational System

"Tablet computers", or simply "tablets" in everyday language, are computers of limited dimensions (versus PCs or laptops) with a touch screen (mostly LCD), on which the interaction between the end user and the device takes place by means of a "stylus" pen or direct manual touch. The first tablet marketed internationally was the "iPad", developed by the Apple technology giant (manufacturer of Macintosh computers and Microsoft's major competitor) in 2010, although it was originally designed by Microsoft as early as 2000 in order to be compatible with the "Windows XP" operating system. The device provides a user experience that almost equals that of the PC, with the option of running apps and games, watching movies, surfing the web, holding remote conversations, and so on. At present there are many different tablets, most of which are based on the Apple "iOS" operating system, the "Android" system belonging to the Google internet giant, or the Microsoft "Windows Mobile" operating system.

In fact, the average tablet has become a device that accompanies the daily routine of private citizens, as it offers a rapid technological response to any need for information or communication and has thus become a technological accessory considered advanced, comfortable, efficient, and preferable over the PC and/or laptop. Considering that the purpose of the Israeli educational system is to equip its graduates with the necessary tools, skills, and capabilities to best function in the digital reality of the 21st century, it is only natural that this device has found its way into the classroom (Salant, 2013; Karsenti & Fievez, 2013).

The powerful entrance of tablets and touch screen technologies into the global state-run educational system is a direct outcome of their convenient and interactive character, constituting an optimal educational technology by encouraging students to search for information, develop interest in many varied fields, ask questions, and search for answers independently. Since the current generation of students is used to frequent daily use of "smart" cellular technologies and touch screens, this is a tool that serves both the interests of the educational system and those of the students. With regard to the students, as of the beginning of the decade, 4.5 million US students were using tablets in class on a daily basis, and according to a survey held among students from the US state-run educational system (elementary school, junior high, and high school) some 90% of students believe that mobile devices will change the way of learning and make it more enjoyable (Shepherd & Reeves, 2011). With regard to the system, as of 2013 tablets were the most

commonly and extensively used learning aid in schools around the world, constituting 70% of the technological learning aid market used by educational systems (Lorah, Parnell, Whitby, & Hantula, 2015).

Nonetheless, it is well known that even if a device is technological and modern, simple and convenient to use, and liked by the students, it is not necessarily an efficient academic-educational aid. Hence, beginning from the current decade many studies have been conducted around the world, seeking to examine the potential benefits of tablets for teachers and students in the educational system (for instance Churchill, Fox, & King, 2012; Fernández-López, Rodríguez-Fórtiz, Rodríguez-Almendros, & Martínez-Segura, 2013). The findings of most of the studies support and validate the awareness that use of tablets as a learning aid in the educational system has significant benefits for the pedagogical process.

Teacher Attitudes Towards Use of Tablets in Class

In their study, Karsenti and Fievez (2013) reviewed over 20 studies on the subject and summarized an impressive list of such advantages and benefits: tablets increase motivation; provide easier access to academic-educational information, its organization and sharing; foster learning and academic performance; facilitate a wider range of teaching and learning strategies; improve the reading experience; encourage productive communication and cooperation between students and teachers and among the students themselves; improve the level of technological literacy (although the current generation of students is characterized by a higher level of this literacy versus their predecessors to begin with); nurture creative thinking; assist teachers with the evaluation process; make it easier to learn writing skills; make it easier to organize tasks and assignments in class; and significantly help students with learning deficiencies. The study itself included surveys and in-depth interviews with more than 6,000 students and over 300 teachers. While all its findings were compatible with the above advantages and benefits of tablets as an academic-educational aid, use of the device in class was also found to involve several significant disadvantages that must be considered. Both students and teachers agreed in their ranking of the disadvantages from major to minor: tablets constitute a significant source of diversion for students from the class and its contents (via games, leisure apps, and sending personal messages); writing on tablets is difficult and frustrating; the process of organizing work on tablets is difficult and complicated; most textbooks have yet to be translated into a digital version and are not available on tablets (or on any other technological-digital device); and in general, use of tablets as an academic aid might be detrimental to students' academic performance.

The most recent study conducted on the use of tablets as study implements in class in the Israeli educational system was published several years ago by Meishar-Tal, Shonfeld, and Ran (2016) and dealt with the digital learning environment, where the traditional study implements (textbooks, notebooks, and writing tools) are replaced by advanced technological-digital learning implements (tablets and laptops). In this qualitative study, 12 teachers in whose classrooms the experiment was carried out were interviewed, expressing their opinion on introducing tablets in their classroom as the main learning accessory.

On one hand, the large majority of the teachers emphasized that it is the teachers who set the level and standard of the class and not necessarily the digital aids at their disposal and that of their students. On the other hand, the same teachers also stressed several fundamental and significant advantages (for them and for their students) in the transition to a digital learning environment (Meishar-Tal et al., 2016), as follows.

Tablets offer the students a simple, familiar, and prompt approach for conveying information and media by the teacher. Whenever the teacher seeks to share with the students a summary, website, picture, video etc., all the students can access the information on their tablet in a matter of seconds in a process that includes several taps on the touch screen (compared to the need to distribute text documents to the entire class, pass a picture among them, or show them a website or video on a single screen at the center of the classroom).

Major online portals, such as the "Moodle", facilitate communication and contact between the students, organizing the material studied and backing it up on a "cloud" server (Davidovitch & Yavich, 2015; Davidovitch & Yavich, 2018). Tablets also enable simple and prompt access to the portal both during class and from the students' home, when preparing home assignments or reviewing the material for the next class or before an exam.

Tablets allow students simple and prompt access at any moment to the backwards design model, where the student first observes the lesson plan and investigates its contents by searching for information on the internet, and only then is the class held, encompassing an integrative discussion on the class topics in light of the research conducted by the students at home. This simulates how some lessons in higher education are conducted (where students receive a "reading list" in preparation for the next lesson) and thus raises the level of the lessons and their standard, as well as the students' abilities and capacity to learn and investigate independently, in a way that prepares them for academic studies.

One of the advantages most emphasized is the teacher's ability to control the study material for each student and thus form individual teaching adapted to their academic level. The material is divided into different levels and each student can access the appropriate assignments at any given moment through his or her tablet, and usually also receive feedback on the answers as well as suggestions for improvement and for further research at home. At the same time, it is notable that the teachers in the study conducted by Meishar-Tal and colleagues (2016) also indicated several inherent disadvantages in using tablets as a learning aid, as use of this technology also brings with it certain costs that the teacher must be aware of in advance.

Similar to any technology that enables a readily available and continuous connection to the web – tablets constitute an inviting and tempting world that is not educational in essence and is not appropriate for schools. The device lets students surf the web at will, send messages to each other, and even play with a variety of games and apps – operations that by definition are unrelated to the topics of the lessons. Moreover, the tablet allows these activities more easily and simply: Where in the past students had to conceal irrelevant reading material from the teacher or send each other written messages without the teacher's knowledge – today by means of the tablet they can do so without looking up from the screen, where their conduct appears no different than that of students who are engaged in the study topics. In addition, the tablet is not an efficient alternative for students who have problems with order and organization. These students might find it hard to find the relevant material in the internal memory of the device, confuse between websites, documents, and other study materials, and even forget the device at home as they would forget a textbook or notebook in a certain subject.

Furthermore, use of the tablet depends on a stable and reliable internet connection, which as known might be unreliable (particularly in institutions the size of a school, which usually has a single server to which all devices are connected via wi-fi). Secondly, the device itself is very sensitive, and any scratch or crack in the touch screen or body of the device (as a result of a fall, uncareful use, or any such possible scenario when used by young students) might harm its functioning or take it completely out of order (and such devices are known to be expensive to fix and/or replace, both for a single device and certainly for several). Finally, the training process necessary in order to utilize the device as a technological learning aid in class (particularly by the teachers but also by the students) is lengthier and more complex, demanding much time at the beginning of the school year.

The Current Study

Effect of the Age Variable on Teacher Attitudes

With regard to differences in the attitudes of teachers and other educators towards integrating tablets as an integral part of the curriculum, in light of the generational divide (particularly differences between Generation X and Generation Y), the current professional literature offers no concrete information (meaning that there is a lack of studies on the subject with an explicit focus on the generational divide). Nevertheless, it is possible to uncover several updated findings regarding the effects of the demographic variable of age on general attitudes towards advanced computer technology and its advantages and disadvantages.

First of all, there is an extensive, varied, and detailed body of knowledge regarding the proven association between the continuous difficulty with acquiring basic skills for implementing modern technologies ("the digital gap") and elderly groups within the population. The encounter of the elderly with relatively innovative technologies such as tablets or even the internet (which is of course not "new" today, but it is necessary to remember that most elderly were only exposed to it as adults) is considerably and distinctly more challenging and frustrating than in previous generations, such that it may be concluded that attitudes towards updated technology and its everyday implementation become more negative the older the individual (Seifert, Reinwand, & Schlomann, 2019).

Secondly, regarding adults who are not elderly, the findings are inconclusive. For instance, a study that examined the attitudes of veterans (aged 18 to 70) towards using tablets for medical applications (Connolly et al., 2018) found no statistically significant differences between the age groups. In contrast, a study that examined the effect of age on the attitudes of participants towards technology perceived as futuristic and revolutionary through a case study of robots (Chien et al., 2019) identified a significant effect of the age variable, which had a direct negative association with attitudes to the subject (i.e., the younger the participants the more positive their attitudes). These findings are compatible with another study that examined attitudes to use of computers among adults (Lee et al., 2019) and found that these attitudes tend to be more positive the younger the participant.

Research Hypotheses

In light of the literature reviewed in this chapter, four research hypotheses were formulated:

Differences would be found in general attitudes to use of tablets in class between young and older teachers, such that younger teachers (Generation Y) will display more positive general attitudes than older teachers (Generation X).

Differences would be found in perceiving the advantages of integrating tablets in class between young and older teachers, such that younger teachers (Generation Y) will perceive more advantages of integrating tablets in class than older teachers (Generation X).

Differences would be found in perceiving the disadvantages of integrating tablets in class between young and older teachers, such that younger teachers (Generation Y) will identify less disadvantages of integrating tablets in class than older teachers (Generation X).

Method

Methodological Paradigm

The study utilized the quantitative research method, based on gathering numerical data in a manner that facilitates statistical analysis.

Research Population

The research population was recruited in a sample that included 154 participants, while making all possible efforts to maintain a relative equal balance between the quantity of participants from Generation X (ages 43-65) and from Generation Y (ages 26-42).

Research Tool

For the current study, the tool chosen was a closed-end questionnaire that included ten questions and four demographic questions, divided as follows:

Part A: Sociodemographic questionnaire for purposes of statistical segmentation (and particularly to divide the participants into generation groups by year of birth). The research findings related to "generation" will be presented by the age cross-section customary in the literature for the "inter-generational" concept (Almog & Almog, 2016).

Part B: Questionnaire on general attitudes to use of tablets in class as an integral part of teaching (questions 1-8). The questions were formulated as statements, for each of which the participants were asked to note their degree of consent on a Likert scale from strongly agree to strongly disagree.

Part C: Questionnaire on advantages versus disadvantages of using tablets as perceived by teachers (two questions). These questions presented to the participants lists of items that constitute advantages of using tablets and items that constitute disadvantages of using tablets. The participants were asked to mark all the correct and relevant items for them for each question (the participants were told that they may and are even requested to mark more than one answer for each question).

Research Variables

Independent Variable: The Generational Divide

Nominal Definition: Division between participants from the Generation X group (born 1965-1980) and participants from the Generation Y group (born 1981 and subsequently) (Albert et al., 2019; Reisenwitz & Fowler, 2019; Ting et al., 2018).

Operative Definition: The age of the participants was explored by question 2 in part A of the research tool, where the participants were asked to note their exact birth year (whereby each participant was included either in the Generation X group or in the Generation Y group).

Dependent Variable 1: Teachers' General Attitudes to Integrating Tablets in Class

Nominal Definition: The perceptions and views of teachers on the cognitive, emotional, and behavioral level (Zilka, 2011; Perloff, 2017) towards integrating tablets in class as an integral part of the annual curriculum (Meishar-Tal et al., 2016; Karsenti & Fievez, 2013).

Operative Definition: The variable of general attitudes towards integrating tablets in class was measured by the general attitudes index, calculated by the mean of the eight relevant questions for the variable in Part B of the research tool (questions 1-8). The distribution measures of the general attitudes index are presented in Table 1.

Table 1

Distribution Measures

Questions	Mean	Standard deviation	Median	Range	Cronbach's alpha
1-8	2.12	0.77	2	1-5	0.913

It is evident from the table that high mean internal reliability was found for the general attitudes index by Cronbach's alpha ($\alpha = 0.913$). The internal reliability test is presented below in Table 2.

Table 2

Internal Reliability

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.913	.915	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	15.006	29.536	.814	.749	.895
Q2	14.753	29.220	.760	.693	.899
Q3	15.292	30.940	.678	.669	.906
Q4	15.182	31.300	.552	.596	.916
Q5	15.026	29.241	.792	.640	.896
Q6	14.325	29.057	.684	.565	.906
Q7	14.766	29.409	.708	.584	.903
Q8	14.513	28.827	.773	.651	.897

Dependent Variable 2: Identifying Advantages of Integrating Tablets in Class

Nominal Definition: Amount of contribution and positive effects (stimulating inquisitiveness, enhancing involvement, easing learning, improving academic achievements, significant bettering of the learning process, etc.) identified by the teachers for integrating tablets in the class as an integral part of the curriculum.

Operative Definition: The amount of advantages identified by each participant was explored by question 9 in Part C of the research tool, and then a mean was calculated for the advantages identified by each age group (younger teachers aged 42 and younger from Generation X, versus older teachers aged 43 and older from Generation Y). The distribution measures appear in Table 3.

Dependent Variable 3: Identifying Disadvantages of Integrating Tablets in Class

Nominal Definition: The amount of distractions and disruptive elements (temptations, disruption of concentration, difficulty to use and apply, etc.) identified by the teachers to integrating tablets in lesson plans and activities in class as an integral part of the curriculum.

Operative Definition: The amount of disadvantages identified by each participant was explored and a mean was calculated for the disadvantages identified by each generation group (younger teachers from Generation Y versus older teachers from Generation X). The distribution measures appear below in Table 3.

Table 3

Distribution Measures for the Mean of Identified Advantages and Disadvantages

Variable	Questions	Mean	Standard deviation	Median	Range
Advantages	9	5.18	2.62	5	1-9
Disadvantages	10	4.87	2.54	5	1-9

Findings

Descriptive statistics

At the end of the data collection process, according to the fully completed research questionnaires, the sample consisted of 154 participants, all teachers in the Israeli educational system. The statistical segmentation of the sample is presented below in Table 4.

Table 4

Descriptive Statistics (Data for The Sample)

Variable	Values	n	%
Gender	Male	11	7.1%
	Female	143	92.9%
Age range	43-65	79	51.3%
	25-42	75	48.7%
Workplace	Elementary school	70	45.5%
	Junior high	34	22.1%
	High school	50	32.5%
Seniority	Less than a year	6	3.9%
	1-5	35	22.7%
	5-10	23	14.9%
	10 years or more	90	58.4%

According to the table, the sample can be characterized by its primary sociodemographic characteristics:

Gender: Absolute and prominent female majority (142 female teachers, 92.9% of the sample) versus males (11 male teachers, 7.1% of the sample). These are representative gender differences (or even higher) of the Israeli educational system (Chai & Lukash, 2016), whereby as of the beginning of the 2016/17 school year women constituted 77% of the entire teaching workforce (about 140 thousand of 180 thousand).

Age Groups: The distribution by age group was relatively average (standard), and the group of teachers aged 43 and older (79 participants, about 51.3% of the sample) was larger than the group of teachers younger than 43 (75 participants, about 48.7% of the sample) by only 4 participants. In addition, the participants' age ranged from 25 to 63, with a median age of 44 and a mean age of 42.78 (standard deviation = 10.05).

Table 5

Descriptive Statistics (Data for The Sample)

Variable	Mean	Standard deviation	Median	Range
Age	42.78	10.05	44	25-63

Workplace: While most of the participants were working in the secondary education system (34 participants in junior high schools, about 22.1% of the sample, and 50 participants in high schools, about 32.5% of the sample, for a total of 84 participants who constitute about 54.6% of the sample), the largest group was that of elementary school staff (70 participants, about 45.5% of the sample).

Professional Seniority: Most of the participants were senior teaching staff with professional seniority of 10 years or more on the job (90 participants, about 58.4% of the sample). In contrast, the other 64 participants were divided between the other seniority ranks, where the group of "new" teachers (seniority of less than a year) was the smallest (only six participants, about 3.9% of the sample).

Examination of the Research Hypotheses

General Attitudes by Age Group

As stated, the first research hypothesis contended that there would be generational differences with regard to the research participants' general attitudes to integrating tablets in class, such that younger teachers aged 26 to 42 would portray more positive general attitudes on the subject than their older colleagues aged 43 to 65. In order to examine the research hypothesis, a statistical analysis was conducted by t-test for independent samples between the independent sociodemographic variable of generational divide (represented, as stated, by the general attitudes index) and the dependent variable of general attitudes towards integrating tablets in class. The findings of the analysis appear below in Table 6.

Table 6

General Attitudes by Age Group

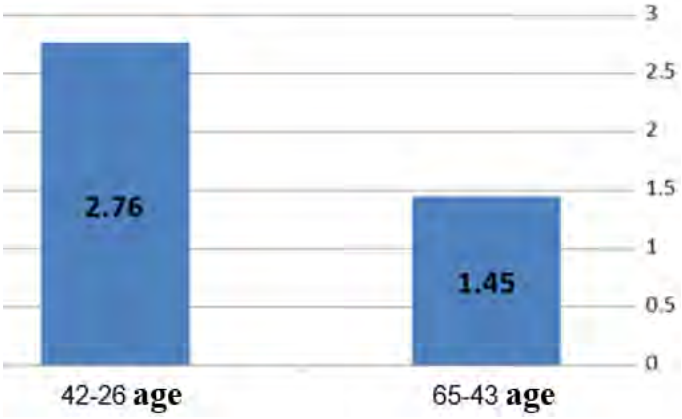
Group Statistics				
Age group	N	Mean	Std. Deviation	Std. Error Mean
43-65	75	2.75833	.822594	.094985
26-42	79	1.44861	.727811	.081885

Independent Samples Test			
		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.003	
	Sig.	.959	
T-test for Equality of Means	T	.558	.556
	Df	152	147.548
	Sig. (2-tailed)	.029	.029

To illustrate the results of the analysis, a comparison between the means of general attitudes for each generational group is presented below in Figure 1.

Figure 1

General Attitudes by Age Group



As evident from the data in Table 6 and particularly in Figure 1, while the mean for general attitudes of the younger teachers aged 26-42 is 2.76, the mean for general attitudes of the older teachers aged 43 to 65 is distinctly lower, at only 1.45 (standard deviation = 0.73). For these differences, statistical significance with high power was found ($t147 = 0.556$, $p < 0.05$). Hence, it is indeed possible to claim significantly that younger teachers (aged 26-42) have more positive general attitudes towards integrating tablets in class (as an integral part of the curriculum) than older teachers (aged 43-65). The first research hypothesis was fully confirmed.

Identifying Advantages by Age Group

The second research hypothesis contended, as stated, that generational differences would be found concerning the perception and identification of the advantages of integrating tablets in class, such that younger teachers aged 26-42 would identify more advantages of integrating tablets in class than older teachers aged 43-65. In order to examine the hypothesis, a statistical analysis was conducted by a t-test for independent samples in order to compare the means of the advantages found by each group. The findings of the analysis are presented below in Table 7.

As evident from the data in Ttable 7 and particularly in Figure 2, while the mean for identifying advantages among the younger teachers aged 26-42 is 5.65 (standard deviation = 2.61), the mean for identifying advantages among the older teachers aged 43 to 65 is distinctly lower, at only 4.77 (standard deviation = 2.63). For these differences, a statistical significance with high power was found ($t151 = -0.932$, $p < 0.05$). Hence, it is indeed possible to claim significantly that younger teachers (aged 26-42) identify more advantages on average for integrating tablets in class (as an integral part of the curriculum) than older teachers (aged 43-65).

Table 7

Identifying advantages by age group

Group Statistics

Age group	N	Mean	Std. Deviation	Std. Error Mean
26-42	75	5.65	2.610	.301
43-65	79	4.77	2.632	.296

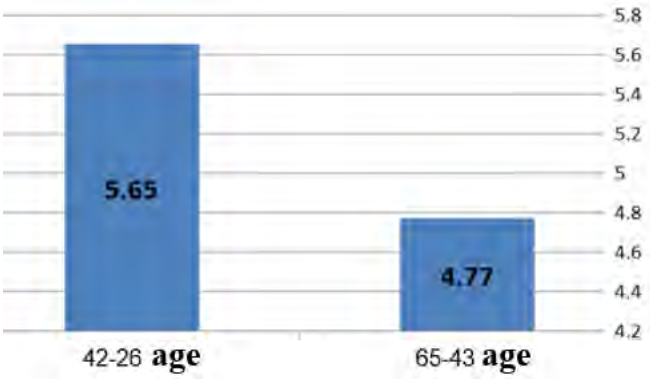
Independent Samples Test

		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.289	
	Sig.	.592	
T-test for Equality of Means	T	-.932	-.932
	Df	152	151.710
	Sig. (2-tailed)	.035	.035

To illustrate the results of the analysis, a comparison between the means for identifying advantages by each generational group is presented below in Figure 2.

Figure 2

Identifying Advantages by Age Group



The second research hypothesis was fully confirmed.

Identifying Disadvantages by Age Group

The third research hypothesis contended, as stated, that generational differences would be found concerning the perception and identification of the disadvantages of integrating tablets in class, such that younger teachers aged 26-42 would identify fewer disadvantages of integrating tablets in class than older teachers aged 43-65. In order to examine the hypothesis, a statistical analysis was conducted by t-test for independent samples in order to compare the means of the disadvantages found for each group. The findings of the analysis are presented below in Table 8.

Table 8

Identifying disadvantages by age group

Group Statistics

Age group	N	Mean	Std. Deviation	Std. Error Mean
42-26	75	4.68	2.510	.290
65-43	79	5.05	2.572	.289

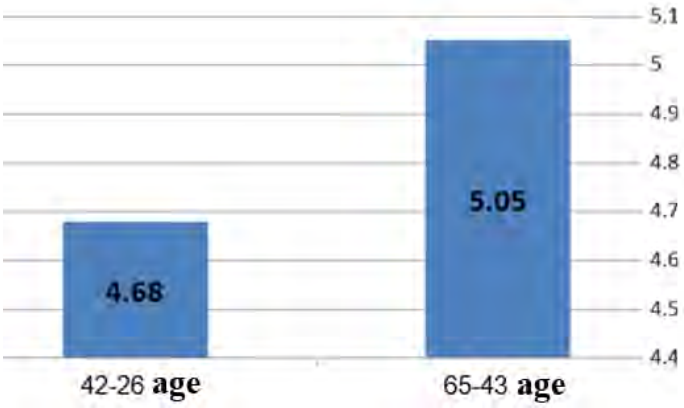
Independent Samples Test

		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.002	
	Sig.	.961	
T-test for Equality of Means	T	-.904	-.905
	Df	152	151.879
	Sig. (2-tailed)	.036	.036

To illustrate the results of the analysis, a comparison between the means for identifying disadvantages for each generational group is presented below in Figure 3.

Figure 3

Identifying Disadvantages by Age Group



As evident from the data in Table 8 and particularly in Figure 3, while the mean for identifying disadvantages among the younger teachers aged 26-42 is 5.05 (standard deviation = 2.51), the mean for identifying disadvantages among the older teachers aged 42 to 65 is distinctly lower, at only 4.68 (standard deviation = 2.5). For these differences, statistical significance with high power was found ($t151 = -0.905$, $p < 0.05$). Hence, it is indeed possible to claim significantly that younger teachers (aged 26-42) identify less disadvantages on average for integrating tablets in class (as an integral part of the curriculum) than older teachers (aged 43-65). The third research hypothesis was fully confirmed.

Discussion

This study sought to examine the effect of the generational affiliation of teachers in the Israeli educational system (the youngest, aged 26-42, from Generation Y, versus the oldest, aged 43-65, from Generation X) on their general attitudes towards integrating tablets in the classroom lesson and activity schedule as an integral part of the Ministry of Education curriculum. In addition, the study sought to compare the amount of advantages and disadvantages identified by each generational group for utilizing tablets as pedagogical aids. For this purpose, a research questionnaire was administered to 154 teachers in the elementary and secondary educational system, and the data that arose from the completed questionnaires were statistically analyzed in order to carry out an accurate and objective comparison. This is the first study of its kind to propose a comparison between Generation X and Generation Y teachers regarding utilizing modern 21st century technology for the process of educating future generations.

The first hypothesis contended that younger teachers (42 and younger) would portray more positive general attitudes towards the use of tablets as an integral part of the curriculum in class than their older colleagues (aged 43 and older). This hypothesis was fully confirmed, as stated, in a manner that is compatible with the knowledge in the literature regarding the general characteristics of the two generational groups in question.

First of all, according to the Strauss-Howe theory, Generation X is a generation of "nomads" who were generated, grew, and developed during the "awakening" period, which as stated is characterized by criticism and even attacks against the current establishment and the familiar social institutions in the name of individualism and even narcissism (Clark, 2019). "Lost children" "declared a war" against the political leadership, with the aim of separating from it in order to nurture themselves in the name of independence and the survival instinct (Albert et al., 2019; Reisenwitz & Fowler, 2019; Ting et al., 2018). To this it should be added that while the discussion of modern technological progress in the current study focused mainly on Generation Y (for obvious reasons as this generation, as stated, grew up and was educated "within" the most advanced computer technology in history), Generation X too became familiar with the contemporary revolutionary home-based technology, i.e., the PC. Analysis of the research findings from a generational perspective indicates that Generation X, who are individualists if not narcissists, were to begin with unable to contend with another change that was so far-reaching. On this subject in particular this generation was capable of accepting the use of the PC, the height of contemporary technology, as a pedagogical aid in the educational system, but a similar view about the current "smart" cellular technology is beyond the capacity of a "nomad" in the "awakening" period who sanctifies the existing elements familiar to him but finds it hard to trust innovations initiated by institutions that he has spent his entire life challenging.

Secondly, according to the above theory (Clark, 2019), Generation Y is almost the exact opposite of Generation X. It is a generation of "heroes" in a time of "unraveling", who on one hand sought to learn from the aspirations of the previous generation by mass purposeful abandonment of social institutions perceived as outdated (such as the marriage institution and careerism), but on the other sought to correct mistakes and return to the bosom of brands that allow the highest level of self-expression. Indeed, as the generation that encountered the most advanced technology from infancy and developed digital literacy on the highest level ever even before beginning compulsory studies – they have no shortage of opportunities and channels for self-expression. This generation seeks to fully embrace whatever reality offers, while demonstrating the available skills and filtering out inadequate contents (for instance, in higher classes on sociopolitical and socioeconomic activism). These two generations converge to a large degree in the significance they ascribe to education, although Generation Y does not reject the option of alternative education, whether according to post-modern methods such as anthroposophy and home schooling or in "the university of life" (Albert et al., 2019; Reisenwitz & Fowler, 2019; Ting et al., 2018). In light of all the above, the more positive distinct attitudes of educators from the Generation Y group towards tablets in class versus those of teachers from Generation X was only to be (and should have been) expected.

In light of the above, the full confirmation of the second research hypothesis (regarding identifying the advantages of tablets as pedagogical aids) and of the third research hypothesis (regarding the similar identification of disadvantages) is no surprise. First and foremost, the customary definition of attitude according to Zilka (2011) and Perloff (2017) should be addressed. Positive attitudes necessarily lead to positive thinking about the object of the attitude (cognitive), positive feelings for it (emotional), and most relevant – the behavior dimension. The combination of all these together paves the way for Generation Y teachers to identify more advantages and less disadvantages of utilizing tablets as integral pedagogical aids (Meishar-Tal et al., 2016; Karsenti & Fievez, 2013). As a generation that learned from infancy to identify the potential and the endless range of possibilities embodied by modern technology – relinquishing tablets as pedagogical aids is not a viable option for the awareness of the average Generation Y teacher. Where PCs in Generation X generated a revolution in the field of education (and for this matter, in all economic, social, cultural fields, etc.) – it can only be imagined how tablets will enrich students' world, enhance their learning experience, increase their involvement, and allow significant learning on outstanding levels that will generate the most educated, skilled, and profitable future generation in history. While the "nomads" from Generation X might perceive this future with some concern – the "heroes" from Generation Y look forward with much excitement which they not only do not try to conceal rather it is an externalized excitement that teachers try to convey to their students with the aim of realigning their view with the educational potential of the tablet (beyond the leisure-related potential, with which even babies are currently familiar).

In conclusion, the research findings as seen through the perspective of current literature knowledge indicate that the study served its purpose and implemented its potential academic impact. Younger teachers are indeed more conceptually suited for educating the future generation, particularly by harnessing the "wonders" of modern technology as pedagogical aids. The half-creative half-obvious perception whereby it is precisely the features of the tablet that create distractions and disturbances (Meishar-Tal et al., 2016) that embody its potential of enriching the learning process (Meishar-Tal et al., 2016; Karsenti & Fievez, 2013) occurs to Generation Y teachers intuitively and almost inherently, while Generation X teachers are still struggling with the very concerns that led them to declare war on the establishment which Generation Y teachers are expected to improve for the children of Generation Z. The future and the future generations are undoubtedly in good hands.

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Appendix

Research Questionnaire

Hello and thank you for your interest!

The following is a questionnaire administered to teachers in the Israeli educational system as part of an academic study. The study deals with the attitudes of educators to utilizing tablets as teaching-learning aids that are an integral part of the curriculum. Please read the questions carefully and answer honestly and authentically as most appropriate (there are no "wrong" answers!). According to the law and the rules of academic ethics, the questionnaire is completely anonymous in order to protect your privacy (do not write your name or any other identifying detail that is not required as part of the questions). Notably, completion of the questionnaire and participation in the study are voluntary and you may refuse to answer certain questions and/or cancel your participation in the study with no adverse effects. The information you will give in the questionnaire is for purposes of the current study only and will never be given to any external extra-academic element. The questions are worded in the male form for reasons of convenience only and refer to both sexes equally.

A. Demographic questionnaire

1. Sex: Male / female.
2. Year of birth: _____
3. Workplace:
    a. Elementary school
    b. Junior high school
    c. Secondary school
4. Professional seniority:
    a. Less than a year
    b. 1-5 years
    c. 5-10 years
    d. 10 years or more

B. General attitudes

The following questions are worded as statements. For each statement, please choose the answer that represents the extent of your agreement.

Statement	Very much	Agree	Neutral	Disagree	Strongly disagree
1. I am in favor of integrating tablets as an integral part of the curriculum					
2. It is important for me to integrate tablets as an integral part of my lesson plans					
3. I would like to see teachers receive more help and support with integrating tablets in class					
4. I would like to improve my proficiency in using tablets so that I can integrate them in my classes better and more efficiently					
5. My students can make good use of tablets in class					
6. Using tablets offers a teaching and learning process that is on a higher level and quality than not using tablets					
7. Use of tablets is more appropriate for our students than learning without tablets					
8. Use of tablets has more advantages than disadvantages					

C. Advantages and Disadvantages

1. This question contains advantages of using tablets as part of teaching in class. Please mark all the advantages that you identify as true and relevant for you.

- o The teaching material is available and accessible to the teacher.
- o The learning material is available and accessible to the student.
- o I can vary the teaching methods.
- o I feel more motivation to prepare for class.
- o I feel more interest and pleasure from my work.
- o The students have more interest during the lesson.
- o The students are involved and participate actively.
- o The students are attentive and concentrated.
- o The students attain good achievements in their exams.

2. This question contains disadvantages of using tablets as part of teaching in class. Please mark all the disadvantages that you identify as true and relevant for you.

- I find it hard to work with tablets during the lesson.
- The students find it hard to work with tablets during the lesson.
- There are no suitable academic and educational contents that can be operated on the tablets.
- The use of tablets is inconvenient and not intuitive, compared to classic aids (books, notebooks, and writing utensils).
- The cost of tablets for schools is too high.
- The students are not concentrated in class and the tablet is an element that encourages distraction from their studies.
- Use of tablets leads to disciplinary problems in class.
- Use of tablets harms my output and the quality of my work as a teacher.
- Use of tablets harms the students' output and the quality of their studies.

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