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HOW FLEXIBLE CLASSROOM CAN IMPROVE SEAMLESS LEARNING

COME LA FLEXIBLE CLASSROOM PUÒ FAVORIRE IL SEAMLESS LEARNING

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Abstract

This paper will describe the way flexible classroom, started at primary school, can effectively promote seamless learning in adulthood. From this point of view, a flexible classroom experience for children can become a toolbox to use in their future to face seamless learning and smart working. This work shows that flexibility and adaptation to change are propaedeutic to improve the scheduling and the selection process of learning spaces and times. To support this research, a questionnaire was filled in by one hundred eighty-three students of the University of Sannio in Benevento, Italy.

In quest'articolo si prenderanno in considerazione le opportunità offerte dall'uso della flexible classroom, a partire dalla scuola primaria, per favorire il seamless learning nell'età adulta. In quest'ottica, l'esperienza della flexible classroom, per un discente, può diventare un importante bagaglio esperienziale per le più complesse attività d'apprendimento e per il lavoro flessibile che svolgerà nel corso della sua vita. Difatti, la flessibilità e l'adattamento al cambiamento contribuiscono ad allineare il proprio stile d'apprendimento e il proprio benessere con gli elementi di discontinuità spaziali e temporali presenti nel processo di insegnamento apprendimento. A supporto della ricerca, è stato somministrato un questionario a centottantatré studenti, presso l'Università degli Studi del Sannio di Benevento.

Keywords

Didactics, Seamless Learning, Flexible Classroom, Smart Working, Bring Your Own Device.
Didattica, Seamless Learning, Flexible Classroom, Smart Working, Bring Your Own Device.

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3 Author of the paragraphs 2, 4 e 7.

1. Flexible classroom as a tool to foster the development of flexibility and adaptation to change in students and teachers

This article will explore the opportunities offered by the use of the flexible classroom, from primary school onwards, to foster seamless learning (Magnoler, Tiraboschi, Trentin, 2019; Trentin, 2019; Seow, Boticki, Chia, 2019; Beozzo, Colombo, 2019; Bubbio, Candeo, La Cava, 2019; Di Tore, Todino, Plutino, 2019) at university (Fang, Yin, Zhang, 2016) and in adulthood (Andresen, Boud, Cohen, 1995; Corbo, 2019). Through a series of reflections supported by other research activities carried out at the University of Salerno, related to the flexible classroom, this contribution seeks to identify a possible path to pursue in the educational field, through a balancing of rules (Todino, Aiello, Sibilio, 2016) and the “flexibility” in the use of spaces in educational settings. These rules are intended to become good practices in the use of space and time available to the learners once become adults. From this point of view, the experience of the flexible classroom for a child can become an important experiential baggage for the more complex learning and working activities that he/she will carry out as an adult. Therefore, training one’s flexibility and adaptation to change (Berthoz, 2011), in terms of temporal rhythms and vicarious use (Berthoz, 2004) of spaces, becomes an important element that marks a more effective future decision-making ability (Berthoz, 2015). Given these premises, the theoretical consideration presented in this paper can be included in the research framework of simplex didactics (Sibilio, 2014) and teacher training, which is inspired by this paradigm (Aiello, 2012; Sibilio, 2014; Zollo, 2017; Sibilio, Zollo, Di Gennaro, Girelli, 2019).

2. Destructuring the training setting through the flexible classroom

In the field of didactics, creativity could be understood as a sort of transversal viaticum to be used in any situation. However, in this paper, we will refer to the creative solutions adopted in the classroom for organizing the training setting, i.e., the physical space within which the teaching-learning process takes place. Gennari (2002) and Pellerey (2002, 2011) convey the need to make the best use of the classroom space in its full potential (Sibilio, 2014) through variable geometries. In the school environment, it is possible to organize the training setting to activate creative behaviors, establish a serene atmosphere within which to grant autonomy, promote personal initiative, stimulate experimentation and student-student and student-teacher relationships. Flexibility and adaptation to change, necessary for simplex didactics (Ibid), become a possible guideline of the didactic action (Todino, 2018). As mentioned above, the teaching-learning process in a flexible classroom takes place in a less structured space, and thus more similar to non-formal contexts that learners will find in many places in which they will be called to learn during their lifetime. Therefore, exercising a high degree of flexibility and adaptation to the learning context from the earliest years of life could foster that ability, in adult subjects, to activate diversified and personalized strategies to acquire knowledge, skills and competences even without spatial and temporal learning continuity.

3. Flexibility as a tool that fosters adaptation to change in the learner

In this paragraph we intend to emphasize that flexibility can be considered a key element for the future of the learner; the Italian Ministry of Education, University and Research, through the Key Competences for Active Citizenship to be acquired at the end of compulsory education issued in 2007, highlighted that it is necessary to: 1) “learn to learn”, i.e. to know how to organize one’s own learning “according to the time available”, one’s own strategies and study-work method; 2) “act autonomously” by recognizing “rules and responsibilities”. Undoubtedly, the Italian Ministry of Education wanted to make it clear that two characteristics, i.e., “resilience” and “adaptive skills” (EU, 2018), are necessary for future citizens, and when used appropriately, they educate to cope with the various vicissitudes of personal and working life. Such “awareness” in future citizens could be achieved through the guidance of the properly trained teacher (Aiello, U. Sharma, M. Sibilio, 2016) who will guide the students to the flexible use of the classroom. Flexibility is closely related to deviation, understood as a simplex property, and to vicar-

iance which can be defined as “a creative deviation made possible by diversity” (Sibilio, Zollo, Di Gennaro, Girelli, 2019, p.25). This vital “tool of living organisms is characterized by an abundance of meanings” (Ibid) that can be framed as the ability “to innovate and interact with others flexibly, tolerantly, and generously, replacing one solution with another to solve a certain problem or employing the solution of one problem to solve another one of a different nature” (Ibid). More specifically, through its close relationship with vicariance, flexibility “represents, in the experience of each individual, a powerful adaptation and learning tool in this sense; the physiologist of the Collège de France believes that to allow the subject the freedom to find his or her own path means to recognize everyone’s diversity” (Ibid). What we have just described in a general sense can be reflected in the educational field, and can be linked to the European recommendations mentioned above, to the broader context of research on inclusive education (Cottini, 2008, 2017; Fiorucci, 2014; Giaconi, 2014; Sibilio, Aiello, 2015; Mura, 2016; Dovi-go, 2017; Aiello, 2019) and to the decrees issued over the years, with particular reference to the Italian Ministerial Decree dated December 27, 2012. In fact, it can be argued that “the recognition and enhancement of diversities, understood as a resource, as elements of positive singularity and originality, constitute one of the founding values of inclusive education; each person has his or her own way of learning, and the challenge for learning and teaching is not to find the good method, but to discover the most appropriate one [for each person and] to identify vicariant solutions is fundamental the link between the memory of the past and future scenarios: vicariance is, as a matter of fact, driven by the projection towards the future. As a consequence, by capitalizing on their past experiences and identifying the needs of their learners, teachers can predict the outcomes of their teaching action, so as to anticipate and solve a range of complex problems” (Sibilio, Zollo, Di Gennaro, Girelli, 2019, p.25). Accordingly, a teacher who fosters a teaching-learning process which places flexibility and adaptation to change as a pivotal element can more effectively support that challenge which perpetually underlies every educational process in the search for the “most appropriate method”, based on different learning styles, to promote that individual process that brings out one’s own way of “learning to learn” and “acting autonomously” by recognizing “rules and responsibilities” (EU, 2018).

4. Seamless learning and flexible classroom: how to correlate them

The American College Personnel Association defines seamless as the types of teaching-learning processes that take place outside the classroom context, in their alternation between purely curricular elements and extra-curricular ones that, however, educate and train people in their entirety (Wong, Looi, 2011). Through seamless learning and thanks to digital and multimedia telecommunications, it is possible to establish geographically distributed relationships that promote distance education: 1) in the domain of formal education (Pellerey, 2002, pp. 378-412), in which the relationship is explicitly designed to realize the teaching-learning process related to the educational institution; 2) in the domain of non-formal education (Ibid), in which the activity is not programmed to be carried out in the school context; 3) in the domain of informal education (Ibid), in which the teaching-learning process takes place in unexpected moments of daily life (Todino, Di Tore, Maffei, De Simone, Sibilio, 2017; Todino, 2018). Indeed, the places of learning can be several: school, after-school classes, oratories, museums, and exhibitions; the teaching-learning process can take place by watching documentaries on television or on YouTube, by chatting with friends, and by playing video games (which, for example, may contain historical or geographical information). Starting from this assumption, a series of domains in which this process takes place, and as already highlighted previously, can be defined: formal, non-formal and informal (Pellerey, 2002, pp. 378-412). In particular, with the evolution of technology, it is good to remember the “Relationship between formal and informal. The informal, today, is made up of technologies. Our lives are permeated by the digital, which mediates our knowledge, our representation and awareness of the past, as well as our relationships. All this implies great risks, but also great possibilities, which it is up to us to balance them out. However, to give up technologies means for the school to give up its task, which is to help subjects

to interpret culture (Rivoltella, 2015). In fact, learning as a whole is a non-linear summation of different elements: a) self-learning; b) teaching-learning process in formal contexts; c) teaching-learning process in non-formal contexts; d) teaching-learning process in informal contexts. The expression “non-linear” is meant to emphasize that the process occurs as opposed to “a linear, static, and cumulative idea of knowledge” (Nigris, 2012, p.65). In Italian, *Seamless* can be translated as “*senza soluzione di continuità*” highlights a way of learning that occurs *without a strict spatial and temporal continuity*. This loss of continuity (if there ever was one) is not to be seen exclusively in negative terms. In fact, the Italian Ministry of Education highlights the importance of extra-curricular experiences, and reminds us to list them in the Three-year Educational Offer Plan, if they are organized directly by the school. Amplifying the educational offer with extra-curricular activities, in fact, promotes a series of key citizenship competencies, and in particular: a) digital competence; b) learning to learn; c) spirit of initiative and entrepreneurship. The teacher should not prioritize educational experiences through a simplification whereby school experiences are considered important, while those extracurricular are not. Instead, the learner should be helped to foster a continuum between them. In seamless learning environments, students are even more encouraged to take advantage of learning about resources within and outside the classroom context, and therefore life experiences are important in making sense of the educational material introduced into the classroom. The relationship between Seamless learning and ICT is key in this context.

5. BYOD (Bring Your Own Device) and mobile learning to support seamless learning

On the basis of what has been described so far, the relationship between seamless learning and ICT (Wong, Looi, 2011; Tan, Kinshuk, McGreal, 2011; Zhaojun, Zhao, Liu, Zhang, Ma, 2014; Junliang, 2014; Huixin, 2015; Qing, 2016; Yushuang, Liu, Han, 2016; Song, 2016) was described by Wong and Looi by moving on several dimensions: (a) aspects related to the digital devices used; (b) aspects related to the teaching-learning process; and (c) social aspects. The two authors correlate the usability of the devices, a concept already defined at the computer science level through the ISO (International Organization for Standardization) code 9241-11:2018 (Ergonomics of human-system interaction - Part 11: Usability: Definitions and concepts) standards from an educational point of view, which, through these digital tools, define the main mobile learning devices to support the seamless learning activities. We could say that seamless learning is favored by the new opportunities offered in the technological field promoting mobile learning and distance learning. What has greatly promoted this change in the educational horizon has been the increase in data infrastructures in the cloud computing area; this expression indicates a web service, therefore accessible through the Internet, which is generally part of hardware-software infrastructures (usually servers) that go well beyond educational purposes, and the following is a list of the main ones: data centers, virtual servers, Internet of Things, networking, security and analytics. Cloud computing services should not be confused with websites and social networks. For example, Amazon EC2 (Amazon’s cloud service) is not to be confused with the e-commerce site, but it is rather an ICT solution offered by Amazon where you can rent virtual servers on which to run, for example, a MOOC by creating your own large-scale open online course by installing Moodle, for instance. Therefore, through cloud computing, as just described, data can be stored online by maximizing their sharing and allowing a lower use of mass storage on your device; conversely, without a network connection, this system cannot be accessed. Turning the focus back to educational aspects, and moving away from aspects related to the galaxy of information systems, cloud computing allows creating online repositories and platforms for educational purposes, thus being able to create paid or free multimedia archives to promote the educational activities carried out by schools, universities, museums and libraries that lay the foundations for seamless learning. In a broader sense, even those repositories that were not developed for educational purposes, such as Youtube, can become such by creating a thematic channel. According to Rivoltella (2015) such repositories are critical for teachers, arguing that “we don’t need to create new digital content. There is already

enough, and of great quality [...] the question is rather to select and aggregate them, comment on them and make them usable for educational purposes” (Ibid). The idea of experimenting with new platforms and the search for new multimedia content should go beyond the creation of digital artifacts replicating what is already available, especially when the level of information technologies (Ibid) is not sufficiently mature. For example, sharing a good documentary on the water cycle might be more effective than making simple power point slides. Furthermore, the BYOD (Bring Your Own Device) factor comes into play, which can empower the self-learning and distance learning processes. If the teaching-learning process can be seen as a non-linear summation of a series of parallel processes (self-learning, formal, non-formal, informal education), through BYOD and the possibility of using platforms for distance learning, it is possible to promote a seamless learning process that is no longer disorganized (Haojun, Xu, 2016). In the case of primary school, when choosing which technologies to propose to children, we must always remember the impact of media on them, as well as the logic of interaction between them and the media used anytime and anywhere without continuity; Rivoltella reminds us that: “it is not the media that do things to children, but it is the children who do things with the media. More than the technologies, it is the practices that matter. The risk is not that of technological determinism, but that of social modeling” (Rivoltella, 2015). In fact, it is the teacher’s task to give a “pedagogical framework” to the activities; furthermore, “without a methodological framework, the application is pure instrumentality. In addition to the pedagogical framework, there is the method that works as a professional organizer. Measuring and quantifying the effectiveness of the use of technology in didactics is almost impossible: the only way is to change professional practices through technology” (Ibid), and continue to deepen the research studies investigating the underlying relationship between the digital world and didactics in a “highly mobile society” (EU, 2018).

6. Flexibility to promote autonomous scheduling ability

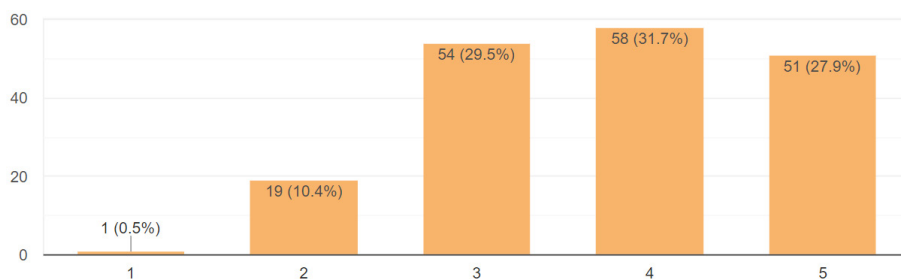
After discussing the relationship between seamless learning and ICT devices, we can address its relationship with the use of space in didactics, trying to highlight the opportunity to take advantage of the flexible classroom in order to develop in students, since primary school, a predisposition to didactics in situations of spatial and temporal discontinuity. In particular, we can focus on those processes that can take place in variable spatial contexts, often not designed to be places dedicated to learning (as instead school classrooms are), which characterize seamless learning; this becomes increasingly prevalent during university studies, and introduces the student to the concept of smart working, which can become a normal practice in adulthood. By smart working, in this contribution, we mean that agile working modality, carried out outside a pre-established office. In this way, a worker can work from home as well as from his or her favorite coffee shop. According to a research carried out by the Smart Working Observatory of the School of Management of the Polytechnic of Milan in January 2019, “smartworkers are on average more satisfied with both the relationship with colleagues and managers, and the organization of their work. The reasons that lead them to join the project are both personal, such as reduced commuting stress and better balance between private and professional life, and work-related, such as increased motivation and productivity. In addition to this, the research also shows that “there are about 480,000 employees who take advantage of smart working [...] about 12% of those who, for the type of work and computer equipment, have the necessary requirements to work in an agile mode. A figure that continues to rise, with a growth of 20% compared to last year. After all, there are more and more large companies that see agile working as an essential requirement to maintain their competitiveness” (SM-POLIMI, 2019) by lowering the fixed costs due to the management of large offices. It could be said that the attention in choosing one’s place in the classroom, a prerogative of the flexible classroom and promoted in a didactic path which relies on the use of spaces in the formal learning context, can be preliminary to seamless spatial and temporal learning and prepares the student to project himself/herself into a world of work which requires more and more flexibility and agility in reconfiguring

one's work activities. But how can the flexible classroom foster seamless learning and smart working? For example, we could highlight some of its characteristics: 1) the flexible classroom increases the learner's awareness of the importance of comfort and relaxation in relation to the seats made available in the classroom (chairs, mats, armchairs, sofas, ottomans, and so on) to be used during study and moments related to learning; 2) through the indications proposed by the teacher, although young, learners become aware of their position in the space based on the seat used, being able to self-evaluate their own well-being; 3) by sitting comfortably, the students can spend more time for learning. Therefore, it is possible to affirm that the flexible classroom can be considered an important experience for the learner who will be asked to carry out more and more articulated study and work activities. In fact, the flexibility of time and space is the main factor, or at least one of the first ones, to bring out one's own learning style (Todino, Aiello, Sibilio, 2016) that progressively becomes the ability to schedule autonomously one's own learning activities, which in turn favors a conscious seamless learning that increases one's own ability to study and work autonomously. We must remember that students accustomed to the flexible classroom since primary school have developed a certain confidence with the peculiarities of their learning style; therefore they will try to shape their study environment according to their needs, will prefer ergonomic seats (Todino, Aiello, Sibilio, 2016), and will choose environments where the noise threshold is consistent with their predisposition to silence or bustle (Todino, 2018). Likewise, they will seek for isolated or crowded places; finally, they will determine their own study time when not subject to synchronous distance learning, as in the case of webinars and video lectures.

7. Outcomes of a questionnaire administered to undergraduate and graduate students

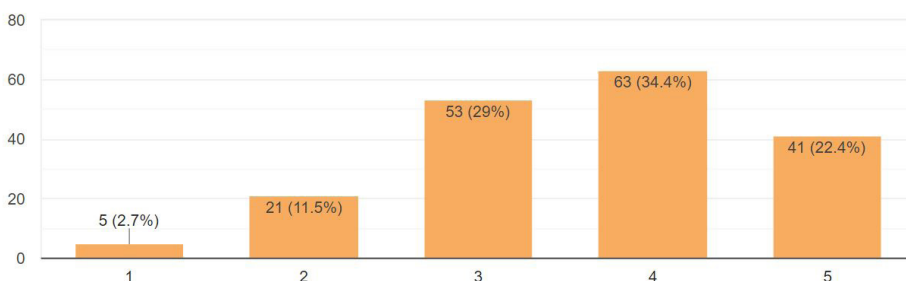
Below are a series of statements, related to seamless learning, which were proposed to the students of the study course entitled "24 university credits training paths" (paths for obtaining further university credits enabling to carry out the teaching activity), at the University of Sannio (Benevento, Italy), during the second semester of the academic year 2019/20, attending the course "Didactic technologies for inclusion" (disciplinary sector M-PED/03) lasting thirty hours; specifically, it was administered after having followed a lesson related to seamless learning and flexible classroom. For each statement the student had to determine, regardless of the teacher's opinion and in a completely anonymous way, how much he/she agreed with it, on a scale starting from "totally disagree", in the figures indicated with number one, and ending with "totally agree", in the figures indicated with number five. The total number of students who completed the questionnaire was one hundred and eighty-three, and it is just a convenience sample to support the considerations advanced in this paper. These statements were often extrapolated directly from this paper. The purpose of this questionnaire was to be able to test if what was expressed in this work could immediately have a positive resonance in students who had already graduated or were about to do so, and therefore had already gone through all cycles of education and could retrospectively review their entire path. The questionnaire was of a structured type and contained some "decoy" questions, which have not been reported in this article, through which it was possible to verify if the students had filled in the proposed questions carefully; thanks to these "decoy" questions, a degree of reliability of the results of 96.2% emerged. The students were mainly from the province of Benevento and aged between twenty-five and forty-five; the group was composed of 82 women and 101 men. Firstly, the students were asked if, in their opinion, "training one's flexibility and adaptation to change can benefit the teaching-learning process", and below is how they answered:

183 responses



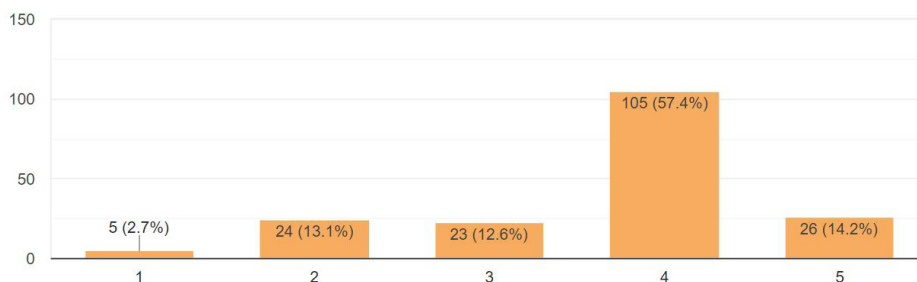
therefore, they were asked if they thought that “the temporal rhythms and the vicarious use of spaces favors the teaching-learning process”, and this is how they answered:

183 responses



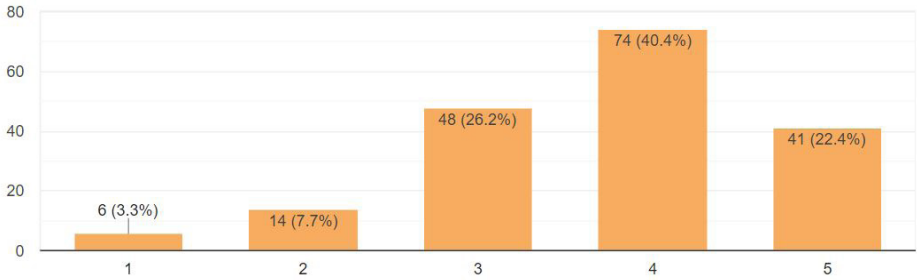
regarding the following statement “the organization of the training setting defines the physical space within which the teaching-learning process takes place”, the students gave the following opinion:

183 responses



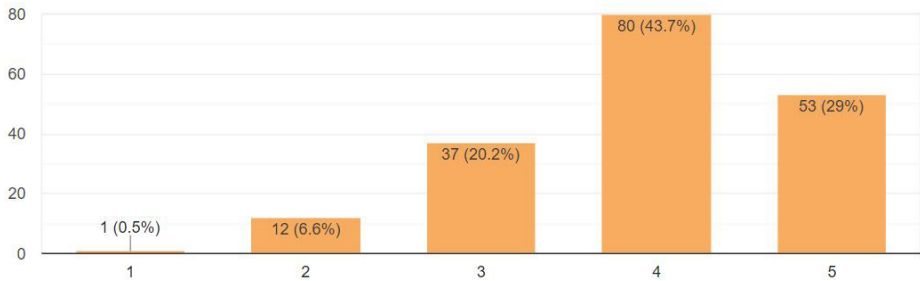
with regard to the fact that “exercising a high degree of flexibility and adaptation to the learning context from the earliest years of life fosters that ability, in adult individuals, to activate diversified and personalized strategies to acquire knowledge, skills and competencies even in the absence of educational continuity both in terms of space and time”, students answered as follows:

183 responses



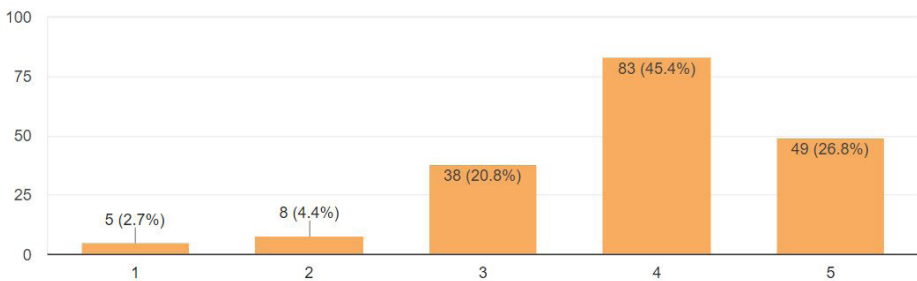
afterwards, they were asked if future citizens need to adapt to change while also being resilient, thus if they have to seek both tradition and innovation as indicated by Rivoltella (2015), and they answered as follows:

183 responses



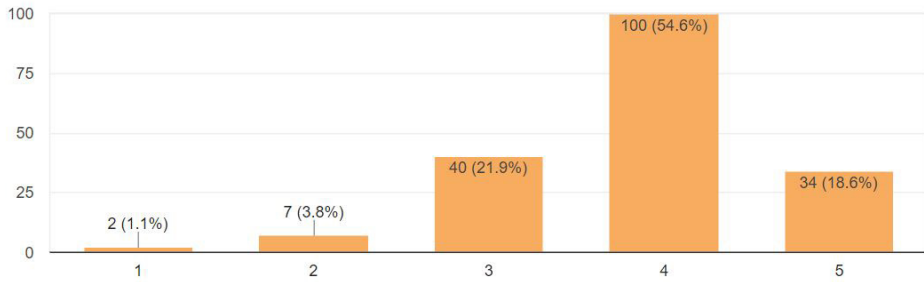
then they were asked if they shared the following statement “curricular and extra-curricular processes as a whole educate and shape people”, and here is the related histogram:

183 responses



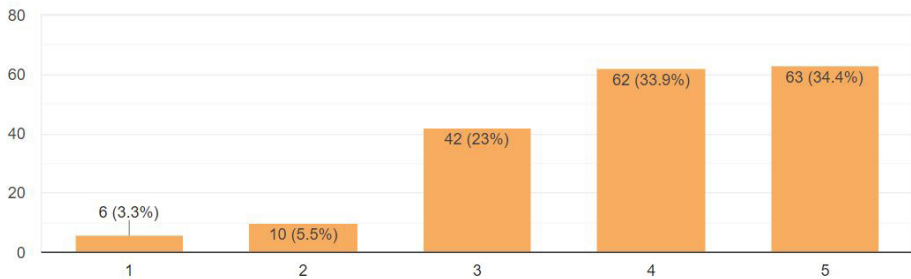
speaking of didactic corporeity (Sibilio, 2001, 2007, 2011; Aiello, 2012), students were asked if “the flexible classroom increases the awareness in the learner of the importance of comfort and relaxation related to the seats made available in the classroom (chairs, mats, armchairs, sofas, ottomans)”, and their opinion is shown below:

183 responses



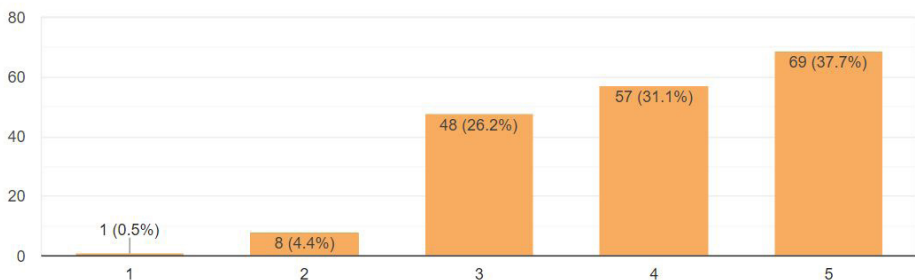
then the emphasis was placed on the concept of awareness, asking if “in the flexible classroom, through the indications proposed by the teacher, although young, learners become aware of their positioning in the space according to the seat used, being able to self-assess their well-being”. Below are the outcomes of the students’ answers:

183 responses



in addition to autonomy, the question of autonomous scheduling was also raised, proposing the following statement: “it is first and foremost flexibility, with regard to time and space, to match one’s own learning style that turns into the autonomous scheduling ability, or the ability to schedule one’s own didactic activities, which in turn favors conscious and productive seamless learning”; below is the graph relating to this topic:

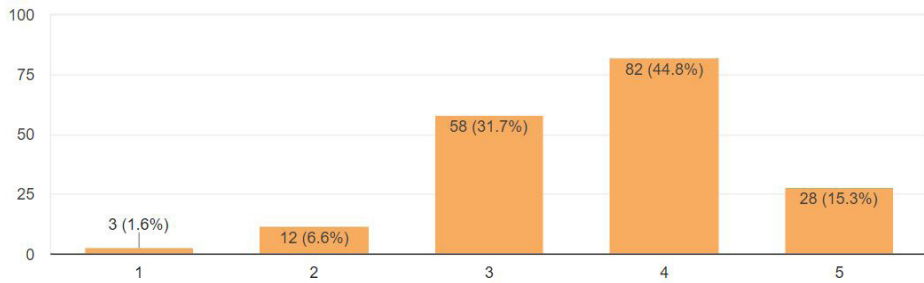
183 responses



Finally, their opinion about the curricular verticality of the flexible classroom practice and the ergonomic factors of the seats was investigated through the following statement: “a student accustomed to the flexible classroom since primary school has developed some confidence with

the peculiarities of his or her learning style, and therefore will prefer ergonomic seats”; below their answers:

183 responses



The data emerged from the research reveal that there is no marked contrast among the students involved with what was proposed in the various paragraphs that make up this work, even when faced with an anonymous questionnaire. Combining the items indicated in the histograms with numbers one, two and three, almost all of the students believe that seamless learning and flexible classroom are valuable and useful resources for future generations. Most of them clearly perceive the importance of posture during their learning activity, as well as of their flexibility and adaptation to change; time rhythms, vicarious use of space, organization of the setting, and autonomous scheduling of one’s own learning activities can help the teaching-learning process. Interesting to note is the predisposition of the students surveyed with regard to the concept of flexibility, which, if exercised from the earliest years of life, can favor seamless learning, and consequently, all those intellectual activities that have to be accomplished in the course of a lifetime. In this regard, it should be emphasized that students perceive a unicum between curricular and extra-curricular processes that, as a whole, educate and shape people. Finally, it is confirmed that students are aware of the importance of postural elements related to comfort and relaxation during the use of digital devices and all activities involving them during the teaching-learning process. Ultimately, the outcomes of this research are comforting and stimulate further investigation on these issues to be carried out on larger samples of students.

8. Conclusions

The progressive autonomy dictated by the flexible classroom model promotes, in the learner, a greater relational emancipation with his/her teacher, who can become a valid support for a seamless teaching-learning process. Consequently, it is possible to hypothesize a flexible classroom design that, from the beginning, clearly reveals its desire to be preliminary to seamless learning. In particular, future research activities could propose to the students already involved in the first questionnaire to fill in a second one, in order to bring out the bio-educational elements (Frauenfelder, 1983) that underlie the concept of the body in movement, typical of the educational action (Sibilio, 2001, 2007, 2011; Aiello, 2012) of the student immersed in the flexible classroom, who shapes his/her learning environment according to his/her needs based on both the ergonomics of the human-computer interfaces (Menegelli, 2011; Di Tore, 2013) and the ergonomics of the seats (Todino, Aiello, Sibilio, 2016); to the issue related to the threshold of environmental noise, the predisposition to isolated or crowded places; and finally to his/her own learning times. Resuming what we stated in the first paragraph, the experience of the flexible classroom relates the child to the learning and working activities that he or she will perform as an adult, following two fundamental points of the European Recommendations: “new ways of learning need to be explored for a society that is becoming increasingly mobile and digital. Digital technologies have an impact on education, training and learning by developing

more flexible learning environments [...] allowing for flexibility and autonomy in organizing learning” (EU, 2018). Therefore, this work outlines a possible trajectory for this autonomy to be achieved, which can rely on what has already been developed as theoretical and practical models for both flexible classroom (Todino, Aiello, Sibilio, 2016) and seamless learning (Magnoler, Tiraboschi, Trentin, 2019; Trentin, 2019; Seow, Boticki, Chia, 2019; Beozzo, Colombo, 2019; Bubbio, Candeo, La Cava, 2019; Di Tore, Todino, Plutino, 2019), and finally on what has already been highlighted by the simplex didactics (Sibilio, 2014; Zollo, 2017; Sibilio, Zollo, Di Gennaro, Girelli, 2019).

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