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# TEACHING, LEARNING AND USE OF TECHNOLOGIES. SOME REFLECTIONS ON THE OPINIONS OF UNIVERSITY STUDENTS

# INSEGNAMENTO, APPRENDIMENTO E USO DELLE TECNOLOGIE. ALCUNE RIFLESSIONI IN MERITO ALLE OPINIONI DEGLI STUDENTI UNIVERSITARI

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**Abstract**
The paper analyses some connections between teaching practices related to technologies and learning strategies used by university students at the beginning of their studies. This analysis is particularly complex. Teachers seem to be looking for a mediation between the need to develop digital skills, to offer a meaning close to the student's experience, and, at the same time, the commitment to guaranteeing the educational relationship its richness and complexity. Students do not seem to encounter problems in learning associated with using some technologies, but not always the practical use of technology follows an actual digital competence. The considerations are based on data analysis of an exploratory research conducted in 2019, targeted at first-year students of the University of Urbino and repeated in 2022 after the pandemic events. The research investigated the relationships between learning, the use of technologies (use of digital tools, students' perceptions of the reliability, clarity and comprehensibility of the information found online) and the percepito of effectiveness related to the Flipped classroom strategy. The survey, repeated in 2022, was supplemented with some queries on the perception of the effectiveness of face-to-face, remote and blended teaching.

Il contributo affronta alcune connessioni esistenti tra le pratiche di insegnamento connesse alle tecnologie e le strategie di apprendimento utilizzate dagli studenti universitari all'inizio del loro percorso di studi. Questa relazione è estremamente articolata. L'insegnamento sembra essere alla ricerca di una mediazione fra la necessità di sviluppare competenze digitali per offrire un significato vicino all'esperienza degli studenti e, allo stesso tempo, l'impegno nel garantire alla relazione educativa tutta la sua ricchezza e complessità. Gli studenti non sembrano incontrare problemi nell'apprendimento connesso con l'uso di alcune tecnologie ma non sempre all'esercizio pratico segue una reale competenza digitale. Le riflessioni sono condotte sulla base di una prima analisi dei dati di una ricerca esplorativa rivolta, nel 2019, agli studenti del primo anno dell'università di Urbino e ripetuta nel 2022 in seguito agli eventi pandemici. La ricerca avviata indagava le relazioni fra apprendimento e uso delle tecnologie (l'uso degli strumenti digitali, le percezioni degli studenti in merito all'affidabilità, alla chiarezza e alla comprensibilità delle informazioni reperite on line) e la percezione di efficacia connessa alle pratiche di insegnamento della strategia *Flipped*. L'indagine, ripetuta nel 2022, è stata integrata con alcune rilevazioni circa la percezione di efficacia della didattica in presenza, a distanza e blended.

**Keywords**: Digital Skills; Teaching Strategies; Flipped classroom.

**Parole chiave**: Competenze digitali; Strategie di insegnamento; Insegnamento capovolto.

## 1. Introduction

Numerous profound tensions have for some time impacted higher and university education. The epoch-making social events that have characterised recent years have prompted a reconfiguration of processes

and a rethinking of issues and problems on multiple levels in educational institutions and among their professionals. Due to the constant emergence of challenging complexities that must be confronted, the professionalism of teachers is also deeply involved in this dynamic field (Stiegler, 2015). Among these challenges, which are all deeply intertwined and acting in a synchronous and overlapping manner, we find: the emergence of new logics of public management; the globalisation of higher education exemplified by the rise in student and professor mobility; the need to turn to the territory for third mission initiatives also for universities; and the attempt to update and innovate teaching practises and particularly, the commitment represented by the both visible and invisible effects of digital technologies on student learning and teaching strategies. In this sense, university teaching is increasingly confronted with a new national and international challenge. A challenge that necessitates renewed focus on the development of the skills expected of students. The processes and practises activated in the teaching/learning relationship contribute to the formation of students and have the capacity to influence or direct their decision-making. The processes and practises that students use to learn influence the teaching processes and content across all subject areas. The phenomenon of digitalisation, which has existed at all levels of education for some time, plays a crucial role in these relationships (Khan, 2013; Meirieu, 2018). In Europe, curriculum development and academic instruction are increasingly mediated digitally, and various forms of digital governance are being implemented. Several documents have been promoted by the European Commission to promote digital education and the use of digital technologies in various education-related fields. Digital technologies have assumed a central role in higher education and learning as mediators (Rivoltella, 2015 and 2017). These digitalization processes foster and structure new practises, diverse textures and social forms of interaction, and suggest new learning methods. Digital platforms emerge initially as heterogeneous artefacts, mediate teaching/learning processes online, and are disengaged from traditional spatial and temporal forms of education. During the impact of the Covid-19 pandemic health emergency on all levels of education, these technologies assumed an incredibly vital role. Thus, academic teaching practise is extraordinarily complex, requiring a constant search for equilibrium and mediation between multiple inputs. In order to address this search for balance in a more informed manner, an exploratory survey was conducted via an online questionnaire to gain a deeper understanding of students' perspectives on the use of certain technology-related tools for studying and learning and teaching strategies, specifically the Flipped Classroom. Despite the fact that this survey is not intended to be representative, but rather exploratory and informative, it could make it easier to identify some critical aspects that are useful for guiding instructional strategies.

## 2. The research

The intention to develop students' digital competence in order to give meaning to their learning experience and the educational relationship in all its complexity is, in a sense, a well-known problem. Students' media use practises would appear to be problem-free, but they would not always be accompanied by digital competence (Prensky, 2013). The purpose of the research was to investigate: the modes and relationships between learning and the digital technologies employed; awareness of and in relation to the reliability, clarity, and comprehensibility of information retrieved online; and perceptions of competence and the efficacy of the *Flipped* strategy employed in the secondary school. The empirical investigation targeted first-year students at the University of Urbino (three-year and single-cycle degree courses). The survey was conducted in November and December 2019 and 1,512 questionnaires were returned out of 2,934 students enrolled as of December 18, 2019. The survey was conducted using an online questionnaire, and student participation was entirely voluntary. The *sample*

*size* appears to adequately represent the target population, but the sampling is *accidental* and therefore *not probabilistic* (Trinchero, 2002). The self-formed sample produced a statistical *bias*, and the resulting reflections are necessarily distorted due to the sampling bias, a phenomenon known as the *selection effect*.

Following the pandemic events of 2022, the same themes were reexamined in a second study. In the most recent edition of the study, these initial aspects were combined with surveys on the perceived efficacy of face-to-face, distance, and *blended* teaching. In contrast to the 2019 survey, the 2022 survey was conducted during the months of May and June and obtained 713 completed questionnaires from a total of 3037 students enrolled in the first year (three-year and single-cycle degree courses) at the University of Urbino. In this scenario, the *sample size* is drastically reduced (from 51.53 % of completed questionnaires in 2019 to 23.47 % in 2022).

Digitally administered to male and female first-year students at the University of Urbino, the questionnaire consists of three sections (personal details, learning and technologies, and teaching strategies), 21 required closed questions, and 12 optional open-ended questions.

Table 1 – Questionnaire structure

| **Investigation area** | **Required closed-ended questions** | **Optional open questions** |
|---|---|---|
| Registry | Sex<br>Year of birth<br>Region of residence<br>High school attended<br>State exam grade<br>Degree course currently attended | |
| Learning and technologies | You prefer to study: alone, in a group, or a combination of both alone and i a group.<br>Which tools do you use to search for study-related information?<br>Which digital tools do you use?<br>Do you feel satisfied by the information you find on the Internet?<br>Do you find the information found online to be understandable?<br>In your opinion, is the information retrieved online reliable?<br>What leads you to think that the information is reliable?<br><br>Have you ever used repositories (digital archives, ...) for your studies?<br>Have you ever used entirely online courses (distance learning courses, MOOC, ...)? | <br><br><br>Explain why?<br><br>Explain why?<br><br>Explain the criteria you used to evaluate the information's reliability<br>Explain why?<br>Explain why? |
| Teaching strategies | The *Flipped Classroom* methodology "flips" the traditional teaching model. Students, thanks to the availability of video lectures and multimedia products, can use the content at home in advance, while the in-depth study phase takes place in the classroom. As a secondary school student, have you had any experience with flipped teaching?<br>In the *Flipped Classroom* approach, students anticipate the content that will be covered in class; they can then reflect on what they have learnt; they formulate questions that they share with the teacher also through social connection tools. Would you like to access content before of the university lectures?<br>In the classroom, the professor intervenes, explains and elaborates. Students engage in critical conversations, group activities and in-depth discussions. They also have to manage quite complex aspects, e.g.: organising the curriculum and schedule; navigating through the relevant | <br><br>If yes, what did you appreciate the most?<br><br>If you answered 'yes' or 'sometimes', why? How?<br>If 'no', why not?<br>If you answered "yes" or "sometimes," explain why. |

| | | |
|---|---|---|
| | info; selecting knowledge; asking questions; deepening concepts; formulating coherent hypotheses and objections. Would you like to experience these modes during your university career?<br>To better prepare for exams, would you like to be able to watch videos of your professor's lectures?<br>Do you attend academic classes?<br>If you answered "yes" or "occasionally" during academic lessons in genera Are you satisfied? Do you feel involved? Do you feel motivated? Do you believe you have acquired new knowledge? Do you feel like you've gained new skills? Would you like to participate in collaborative work? Would yo like to engage in discussion? Are you incentivised to attend? | If "no", what are the reasons?<br><br>Why?<br><br>If you have other comments, you can add them here. |

The majority of survey respondents are women. In 2019, the female gender is represented by 70.4% while the male gender is 29.6%. In 2022, we find 79.2% female gender as opposed to 20.8% male gender. In 2019, the most prevalent birth year (48.6%) is 2000, while in 2022, 46.8% of respondents were born in 2002. Marche is the region of origin for 50.6% of student respondents in 2019, compared to 46.2% in 2022. The majority of student respondents (63.5% in 2019 and 62.4% in 2022) attended high school. In accordance with the data presented in the table below, there appears to be a disparity between the two surveys in terms of the state examination scores, with the post-pandemic sample receiving higher scores.

Table 2. Evaluation attained on the State Examination

| | % 2019 | % cumulative | % 2022 | % cumulative |
|---|---|---|---|---|
| From 91 to 100/100 | 18,8 | 18,8 | 32,5 | 32,5 |
| From 81 to 90/100 | 18,6 | 37,4 | 22,2 | 54,7 |
| From 71 to 80/100 | 31 | 68,4 | 22,7 | 77,4 |
| From 60 to 70/100 | 29,3 | 97,3 | 16,5 | 93,9 |
| Other evaluations | 2,3 | 100 | 6,1 | 100 |

## 3. The opinions of students regarding the reliability, clarity, and comprehensibility of online information

Digital competence presents a great deal of complexity in terms of its contrasting levels between the epistemological, ethical, cognitive, and pedagogical/educational spheres, and issues pertaining to the reliability, clarity, and comprehensibility of online information are closely connected to these levels. In these areas and at these levels, university students, as well as education and education professionals, such as teachers and researchers, may face significant challenges. In the past, schools held a monopoly on the transmission of knowledge, and this monopoly conferred a certain legitimacy on the institution, according to a conventional and rather traditional conception. Today, knowledge freely available on the Internet appears to have undermined the legitimacy of the school's function. Undoubtedly, a great deal of information is readily accessible in a short amount of time. Could this information qualify as knowledge? Not always. The operation of the most popular search engines favours documents that confirm widely held beliefs, which are frequently actively seeks by users and therefore rank highly. This mechanism is highlighted by some of Morozov's harshest criticisms of the falsely free and democratic network system, even in the field of knowledge (Morozov, 2011, 2013, 2014, 2016). A

search on the term 'astrology,' for instance, will immediately return numerous articles and documents, and even commercial websites, that support astrology. In the list of discovered resources, there will be numerous scientific articles and essential documents located far away and unreachable immediately. The rapidity and simplicity with which search engines provide answers to questions creates a false impression of the relevance and credibility of the websites identified as information sources (Bonaiuti, Vivanet, 2013). Unfortunately, the Internet is not always a reliable source of legitimate or scientific information. To be able to differentiate them, it is necessary to possess knowledge. For those with a sufficient knowledge base on a given topic, the Internet provides an abundance of useful resources and documents. The Internet provides beginners with an abundance of information that is frequently unmanageable. Certainly, teaching transversal techniques of documentary research can be beneficial, but it does not appear to be sufficient. For instance, a physicist can easily distinguish, within his field, weak or fallacious resources from those that are not, whereas an economist confronted with physics-related texts will have great difficulty identifying the scientifically accurate ones. 'Educating with media', in the sense of using products and documents to support instruction, seems increasingly distinct from 'educating about media', which aims to develop critical thinking to be applied to media content (Rivoltella, Rossi, 2019).

Due to the limitations of this contribution, only a brief description of a portion of the survey can be provided. In any case, a simple comparison of the responses provided by first-year students in 2019 (1512 answers) and 2022 (713 answers) can provide some insight into their perspectives and allow us to initiate preliminary reflections.

What resources do you use to search for academic-related information?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| Internet | 84 | 87 |
| Books | 81,9 | 52,5 |
| Social (notes, handouts, …) | 49 | 54 |
| Advices and colleagues' notes | 42,9 | 54 |
| Multimedia sources | 33,2 | 45,9 |
| Other … | … | … |

After three years, the book's value as a source of information for study has decreased by 29.4%.

Which digital resources do you utilise?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st years, n. 713) in % |
|---|---|---|
| Computer | 86,8 | 94,5 |
| Smartphone | 78,1 | 77,4 |
| Tablet | 17,1 | 27,1 |

In 2022, student respondents will make greater use of computers and tablets than their 2019 colleagues.

Do you feel satisfied with the information you find through the Internet?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| A lot | 13,6 | 22,2 |
| Sufficiently | 74,9 | 68,4 |
| A little | 9,5 | 7 |
| Not at all | 0,3 | 0,49 |

| | | |
|---|---|---|
| I don't know | 1,8 | 2 |

The responses associated with extremely strongly increased by 8.6% compared to the previous period. The analysis of the free-form responses reveals that the simplicity and clarity of the information available online are highly valued. This clarity and simplicity contrasts with the technical language used by professors during classes and the formal language found in the study materials outlined in the official programmes. The students indicate that the information retrieved online is, in some way, preferable to the formal language of the professors because it permits an initial decoding of the information's complexity that is useful for approaching the formal and technical study materials specified by the programmes.

Do you find the information found online to be understandable?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| A lot | 11,4 | 17,8 |
| Sufficiently | 80 | 74,3 |
| A little | 6,3 | 5,6 |
| Not at all | 0,2 | 0,3 |
| I don't know | 2,1 | 2 |

The data indicate a high level of satisfaction with the clarity of the online answers (91.4 is the cumulative percentage of very and fairly in 2019 reaching 92.1 in the cumulative percentage of 2022). The open-ended responses demonstrate that the comprehensibility of information is determined by the simplicity of the information placed first by the search engine in response to the query. For instance, sites like Wikipedia distinguish themselves by placing themselves at the top, providing concise concepts, and employing "clear" and "known" terms.

According to you, is the information found online reliable?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| A lot | 3,7 | 4,9 |
| Sufficiently | 75,8 | 74,9 |
| A little | 16,1 | 15,4 |
| Not at all | 0,5 | 0,7 |
| I don't know | 3,8 | 4,1 |

Comparing the concept of trustworthiness to the level of 'trust' placed in websites, some ambiguities emerge, which were already present in 2019 and appear to persist. We find less than 5% for very and greater than 15% for little. This hypothetical "trust" is better illustrated in the open answers. Sites that, for instance, use terms that are similar or analogous to the references and terms used in educational contexts by teachers or in official study materials are more credible. In the open-ended responses, the recognition of trustworthiness is also associated with a satisfactory or high personal perception of one's own ability and knowledge regarding the content and knowledge sought.

What makes you believe that the information is reliable?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| I'm not sure. I check different sites | 47,3 | 43,6 |
| They occur on well-known sites | 27,3 | 27,8 |
| They are comprehensible | 10 | 9,1 |

| | | |
|---|---|---|
| They are in first place. Ergo, the most popular and most reliable | 7,7 | 8,6 |
| Other responses | … | …. |

Even open-ended responses provide interpretations that oscillate between a 'trust' expressed towards certain sites considered reliable (institutional sites, sites recommended by professors, sites that are also aesthetically well maintained, etc.) and a trust in one's own decoding and defining abilities resulting from one's experience on the Internet and one's specific knowledge.

## 4. The opinions of the students on the *flipped* strategy

The *Flipped* strategy is an educational approach that emerged in the United States at the end of the 1990s, in which the lesson is freely accessible in digital form (mainly online videos, but also slides, websites, etc.) or in paper form (textbooks, photocopies, etc.) so that students can acquire the content outside of the classroom. Class time is utilised for application exercises and explanation phases between groups of students and teachers, as well as between groups of students. The time teachers and students spend in the classroom is not spent presenting "knowledge," but rather on cooperative activities, exchange, comparison, deepening between teachers and students, or peer cooperation activities (Bergmann, Sams, 2012, 2014). In the Flipped approach, the traditional method of instruction is therefore "flipped" through the implementation of a mode in which school time and activities are altered by means of technological resources. This practise, which is not new but is rapidly spreading across the globe, allows for the use of content in advance, thanks to the availability of video lessons and multimedia products, while the phase of reflection, in-depth study, and application is postponed and placed in the classroom. It is, in fact, an organisational mode whose fundamental merit is enhancing, recovering, and integrating active strategies that have already been widely experimented, proposing ways to organise spaces and times that are functional to their effectiveness (Fioretti, 2013).

From this perspective, it was interesting to observe the opinions of first-year university students regarding their knowledge of this approach, their experiences in secondary school, and their recognition of the potential and challenges they may encounter in this strategy that uses technology to convey learning content and requires teachers and students to improve their abilities in this regard.

Have you utilised flipped instruction in secondary education?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| Yes | 23,7 | 33 |
| No | 76,3 | 67 |

Three years later, the percentage of secondary school students using Flipped experiences has increased by approximately ten points. Reading the free-form responses, however, reveals a profound misunderstanding of the Flipped practise. The examples provided do not appear to refer specifically to Flipped teaching experiences. Typically, homework assignments are completed at home, both individually and in groups (e.g., research or in-depth studies on topics assigned by the teacher), and then discussed in class with the rest of the classmates. The variety of responses identifies a great heterogeneity of experiences that are, in various ways, comparable to Flipped practise; however, the essential elements of this strategy do not appear to be present in the experiences.

Do you want to have access to the content to be learned prior to university classes?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| Yes, always | 58,4 | 70,4 |
| Sometimes | 34 | 24,7 |
| No, never | 7,7 | 4,9 |

The post-pandemic survey indicates an increase in the willingness to always access content before university lectures. In this regard, it may be surprising that a considerable number of student responses express doubt in this regard. The analysis of the free-form responses highlights the concern that individual and advanced study may not adequately prepare students to comprehend the course material. Doubting students express a clear desire to be guided and oriented, in a specific manner, by teachers who are recognised as competent and experienced, regarding the most significant aspects of the content to be learned. Some students are extremely perplexed by the possibility of learning through discussion and interaction with classmates who do not demonstrate particular knowledge and skills regarding the course topics.

Do you wish to participate in group discussion, conflict, and elaboration during your university courses?

| | 2019 (respondents 1st year, n. 1512) in % | 2022 (respondents 1st year, n. 713) in % |
|---|---|---|
| Yes | 63,1 | 61,9 |
| No | 9,7 | 9 |
| Sometimes | 27,2 | 29,2 |

The open-ended responses clarify the fears and doubts expressed by a number of students regarding the difficulty of expressing oneself in front of others and the desire not to expose oneself in an open and conversational manner with university classmates.

Would you be interested in viewing lecture videos to better prepare for exams?

| | 2019 (students 1st year, n. 1512) in % | 2022 (students 1st year, n. 713) in % |
|---|---|---|
| Yes | 92,1 | 97,1 |
| No | 7,9 | 2,9 |

In this instance, the post-pandemic percentage of agreement is overwhelmingly high, with the vast majority of students willing to use lecture videos to better prepare for exams. Probably, their previous years of forced distance learning have reinforced certain skills and methods of utilising technological tools.

## 5. Conclusion

The issue of digital competences is particularly complex, and the issues investigated by a questionnaire designed to elicit students' opinions on online information search tools and certain strategies, such as the *Flipped* approach, merit additional and in-depth research. There are several problems: epistemological issues (does the questionnaire used state clearly the theoretical and value assumptions from which it moves? Does it succeed in clearly defining the research question?); methodological issues (the representativeness and size of the sample of respondents); the instrument used (investigating opinions is complex but crucial because opinions guide students' study and learning actions); the period over which the two surveys were conducted; the evaluation of the impact of the prolonged health emergency. All of these issues merit thorough investigation and examination from two perspectives: a forthcoming in-depth data analysis and new, more representative surveys.

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