The Acceptance of VLEs (Virtual Learning Environments) by Primary School Teachers

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Abstract: This article presents a study on the conditions of use of a VLE (Virtual Learning Environment) by primary school teachers. To this end, we used research related to activity theory and implemented qualitative methods (individual and collective interviews). Our study describes how teachers (8 participants) perceived the role of the VLE in the evolution of their working practices (maintaining, transforming or restricting existent practices), in their relationship with parents and in the follow-up of their students.

1 INTRODUCTION

The definition of Virtual Learning Environments differs from country to country. In UK, the VLEs were designed mainly as pedagogical and collaborative and lately there were added school management tools. In this view, a VLE is *"learner centred and facilitates the offering of active learning opportunities, including specific tutor guidance, granularity of group working by tutor and learners"* (Stiles, 2000). By contrast, in France, the VLEs were since the beginning designed as a unique access workspace, both for school management and for learning activities. The initially management modules (marks, absences) designed for virtual classrooms served then to design pedagogical applications and collaborative group works. In both British and French systems, VLEs aim to encourage communication and collaborative practices between the members of a school community through tools – such as blogging and a messaging service – and to foster access to information (in regards to homework, for example) through the use of a digital planner.

The last report of OECD (Organization for Economic Co-operation and Development) mentions that technologies are not sufficient to support teaching and instructional purposes. They are simple tools in the hands of teachers and it depends on them to take good use in their activities. Yet, our society is *"not yet good enough at the kind of pedagogies that make the most of technologies (…). Adding 21st century technologies to 20th-century teaching practices will just dilute the effectiveness of teaching"* (OECD, 2015, p. 3). This is the reason why we choose to analyse the technology acceptance of teachers and the practices they develop.

2 TEACHERS' VLE ACCEPTANCE STUDIES

Some studies analyse the teachers' attitudes to and beliefs about this type of technology. In their study, Kolias et al. (2005) examined attitudes and beliefs of teachers from Finland, Greece, Italy and the Netherlands after a first teaching experience with a computer learning environment in order to see if they would be able to include technology in their everyday practices. The study gives very promising conclusion about the possible use of technology, but miss of real practice and acceptance observations.

Others studies analyse the teachers practices and the problems linked with the VLE uses. Indeed, the VLEs have been mainly used in secondary education and higher education. French studies showed that

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certain teachers had partly integrated VLEs in their professional practices. Prieur and Steck (2011) indicated that, although teachers recognized the pedagogical benefits of VLEs, they were not ready to endorse them due to poor ergonomics, and to their lack of training and proficiency in IT tools. Teachers also felt overworked and resisted the idea of extending the *"school space-time continuum"* outside of school. For their part, Poyet and Genevois (2010) identified differences in culture: since VLEs are often seen as management tools for businesses, they may need to be "translated" and the meaning adapted to the context of school. One of the ways to solve this issue would be to use school-based metaphors ("notebooks", "lockers") instead of bureaucratic terms ("messaging", "agenda"). Poyet and Genevois showed how VLE tools were unfamiliar to teachers and how the latter did not fully grasp their pedagogical uses and benefits. This led to unsatisfying experimental phases in which teachers tested the tool's various functions, *"without always having a full representation of the tool's potentialities and specific limits"*. This drew teachers to prefer using personal and familiar tools (such as their own emails). Similar observations were made by Pacurar and Abbas (2014) who noticed that the VLE was perceived as a communication tool (through the messaging service) and an administrative tool (assigning grades, writing down absences), but that it *"was not firmly anchored in pedagogical practices"*, especially when it came to using it during class time or to design class material. The prescribed uses did not answer the real needs felt by teachers on a daily basis. These conclusions are also given by Firmin and Genesi, (2013) and Blin and Munro (2008). Bruillard (2011) mentioned the complexities in deploying VLEs when a variety of people are involved: teachers, parents, students, school districts, local authorities, software publishers and the Ministry of Education. Bruillard also noticed a paradox between the Ministry's will to open schools up to parents, and the actual low amount of parental implication. Teachers are also concerned that parents may interfere in their pedagogical choices. These difficulties are further amplified by the fact that teachers who use VLEs do not get institutional recognition. Practitioners in the field have also felt disempowered since external companies were called to design the VLEs. There is also the risk of creating inequalities or even to exclude certain parents who are less equipped and trained in digital technologies. Missonier (2008) developed these points based on the design and the deployment of VLE projects that were managed by local authorities and service providers. These approaches have not always been very effective, since they depend on the project manager – who may lack in transparency or carefulness – to solve disputes linked to functionalities or uses. This, in turn, leads to different protagonists within the network to decrease their commitment. Prieur and Steck (2011) recommend implementing spaces for ideas *"that articulate the current practices of teachers, practices that can help foster the acquisition of skills and the potentialities of different VLE tools, in order to develop possible instrumentalisations"*. This would help to adapt prescribed uses, depending on the context.

Voulgre (2011) introduced a political dimension. Teachers are generally favourable to arguments promoting the uses of VLEs: the latter are useful to catch up on classes (illness, loss of grades), to retrieve previous work or to support students with schooling difficulties. But the fact that not all children have Internet at home represents an inequality, thus preventing teachers from fully using VLEs. Such a refusal is seen as a "*type of counter-power*" against political injunctions. On the contrary, acceptance factors are linked to the respect of hierarchy, of the institution and of the law (obligation to use a VLE); other positive factors are linked to the values of solidarity and cooperation that are promoted by VLE tools.

Other studies also point out the importance of technical infrastructure: access to the computer classroom, number of computers in classrooms, Internet access, broadband speed and technical support. The school institution's management, the organisational culture and VLE implementation strategies have all a great role in technology acceptance (Keller, 2006; Keller; 2009; Osika, Johnson and Buteau 2009; Babic, 2012). Finally, lack of competences in technology, lack of confidence and lack of time were mentioned (Karasavvidis, 2009). In the end, all of these studies showed that the acceptance of VLEs by teachers depended on practical considerations, as well as strategic concerns that were both professional and political.

VLE began to be deployed now in primary schools. Only a few studies explored the acceptance of VLE in these contexts. Berry (2005) highlighted that primary school pupils can use VLEs and appreciate it in case of absence because they can easily get lesson content and homework. Moreover, they have more confidence to discuss mathematics problems on the VLE platform. But younger

children differ greatly from students in secondary or higher education in terms of their autonomy and their use of digital media. So we are led to ask ourselves how primary school teachers take this factor into account and more generally how they include such a new tool in their professional practices: are they able to adapt or develop their practices or not and what are their reasons?

We need to evaluate how actual teaching practices can evolve in order to integrate and make profit of the existing technologies. This is why we aimed in this field study to identify the current teaching practices that constitute the core of professional activities for primary school teachers. We also wanted to identify tensions that could lead us to find ways to improve the design of VLEs and to provide recommendations for uses and services.

3 ANALYSING ACCEPTANCE

3.1 Acceptance Models

In Davis's (Davis, 1989) Technology Acceptance Model (TAM), certain requirements like perceived usefulness and perceived ease of use are ill-adapted to improve the design and the implementation of a system, to describe actual practices at work and so to study the eligibility of educational platforms. Indeed, the TAM has methodological shortcomings (its factor-structure is not systematically replicated, the questionnaire is the only assessment method used) and it is out of line with the educational environment. The TAM is a predictive and deterministic model which is limited to individual socio-cognitive factors and which does not take into account the specific context of using the technology in the educational sector. This context includes elements such as a regulatory environment, a school curriculum, relationships with families, and professional practices and histories. The activity theory can help to understand the act of teaching in all its complexity.

3.2 Activity Theory

Activity theory, as detailed by Engeström, Miettinen and Punamaki (1999) and Kuutti (1996), provides more complete elements to quantify the context of use. Instead of referring to uses, activity theory refers to an activity system: the user (subject) has a precise objective and accomplishes it by using certain instruments (tools). He/she fits into a social community (the group of people who intervene in the activity). This community is regulated by certain operating rules (the norms and rules to respect in a given activity), and respects specific divisions of work (the ways in which roles are distributed among individuals).

Activity systems are characterized by contradictions (or internal tensions), which favour and trigger innovation; such changes contribute to further development. Therefore, activity theory appears to be useful to qualify the context as well as to define the dynamics at work when accepting and taking ownership of technology.

3.3 The Teacher's Activity System

The teacher's activity system is summarized in figure 1 and relates to the educator's daily practices. These practices occur with or without instruments, since they often take the shape of direct communication in class, and can be supplemented with instruments such as the board, posters, notebooks, etc. These practices follow rules that are specific to the educational system and fit into an educational community composed of teachers, students and parents. The division of work includes the effective practices inherent to the profession and the ways in which the different tasks are distributed among the different protagonists. In terms of the education and follow-up of students, teachers and parents work together, but in different contexts. Each group's responsibility is therefore well defined. With the arrival of a new technological tool, used both in class and at home, these differentiated roles and identities may come into conflict.

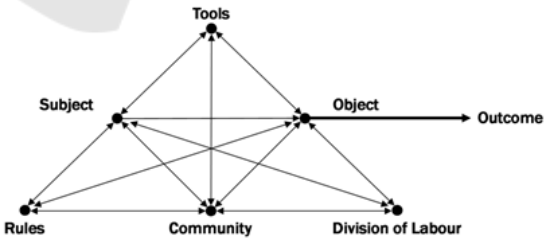

Figure 1: Activity system (Engeström, Miettinen and Punamaki, 1999).

Furthermore, according to Rabardel and Bourmaud (2003), the conditions needed to implement human-machine interactions lead to the modification of the technology's properties and, consequently, to the readjustment of human conducts. This occurs through the process known by Rabardel and Bourmaud as the instrumental genesis

(a double process of instrumentation/ instrumentalisation). The tool therefore does not only exist for itself or in an isolated way. It is socially embedded and fits within certain practices, habits and social communities that guide its use and transform its characteristics. This theoretical perspective therefore leads us to consider acceptance as being situated, meaning that it is constructed in and by the activity (Bobillier-Chaumon, 2013).

Like Kolias et al. (2005) we choose using the activity theory to detect VLE acceptance and non-acceptance factors according to contexts of use. The standards considered to define acceptance are linked to the ways in which the profession is practiced, to social and work constructs and to ways in which the VLE tool is used and deployed.

4 FIELD STUDY METHODOLOGY

The approach developed in this study is essentially qualitative. We aimed to collect testimonies from teachers in which they represented and perceived their experiences as they teached with and used a VLE.

4.1 Observed Context and Participants

All participants in our study were part of the Versailles and Caen school districts (situated near Paris). 6 schools were in the Versailles district and 6 were in the Caen district. They volunteered to experiment with the VLE One for 2 years. At the time of our study, 26 teachers (in both districts) had volunteered to be part of the experiment and had already used the VLE One for 3 to 6 months.

We questioned 8 teachers over the course of 4 individual interviews and 2 group interviews (with 2 teachers in each interview). Among the teachers, two were school principals who were also giving classes (in first and fifth grades). The other teachers worked in first grade (2), second grade (1) and fifth grade (3) classes. The group of participants was composed of seven women and one man. The schools were all situated in urban areas, in the Versailles school district (6) and in the Caen district (2). The average age of participants was of 46 years with a standard deviation of 15.

4.2 Description of the Tool

The VLE used in this study is entitled One. It was specifically designed for an elementary school audience, with ergonomics and interfaces that are suitable for children (Budiu and Nielsen, 2010, Lueder and Rice 2007). The One interface is therefore simple, intuitive and attractive (see Figure 2). The collaboration functions that are offered consist in a Messaging Service, a Blog and a Storage Space. One also offers customization features (My Account, My Mood), notifications (a News Feed, birthday notifications), organizational tools (Calendar) and a school website. Each user has the option of customizing his/her profile with a picture and personal information (motto, mood, information on favourite leisure activities, films, music, food). Students are by default included in their class group and have access to the content published in the group by the teacher.

When we were conducting our study, the VLE One had not yet offered services such as the Planner notebook and the Multimedia notebook.

Figure 2: Interfaces for the pages « News Feed » « The Classroom » and « My Apps » in the VLE One.

4.3 Data Collection

Teachers participated to semi-structured interviews. These interviews lasted an hour and a half on average and tackled the following themes: the teachers' experience with TEL (Technology Enhanced Learning), the school's computer equipment, the teacher's representation of the VLE, needs related to the VLE, the VLE's usefulness, ease of use and intentions of use, difficulties of use, and the implications of the VLE for the teaching profession. Teachers could speak openly and were able to give their critical point of view on various uses, share their own representations of the tool, and give their opinion on functions that were being developed, such as the planner notebook, the digital parent-teacher notebook and the multimedia notebook. They were also welcome to recount difficulties linked to the use of the VLE, using Flanagan's critical incident technique (Flanagan, 1954).

4.4 Analysing the Teachers' Interviews

The interviews were entirely recorded and transcribed so that they could be systematically studied (Bardin, 1996). We considered in our analysis the comments that associated One with daily teaching practices, operating rules (linked to the educational system), the education community (composed of teachers, students and parents) and the division of work (the ways in which tasks are shared between different groups of people). We used the sentence – a basic syntactic unit built around a verb – as the main unit to study the transcripts. Sentences were identified as in the following example: *"I showed them how to make folders (sentence 1)/, but it is hard for the students (sentence 2)"*. We also distinguished between the comments that were rather favourable (supporting initiatives) and the ones that were less favourable (difficulties in use). We proceeded to do counts and percentage calculations to rank the different factors. We determined that the users had accepted the VLE when they mentioned the successful ways in which they used it, the adjustments they made or the contradictions they encountered and overcame. Categories weren't pre-established and we retained the themes that had been mentioned at least three times.

5 RESULTS

The analysis revealed 4 main themes (see Table 1), as well as 16 sub-factors (see Table 2): (1) factors linked to the practice of the profession (the workload, raising awareness of digital uses and habits, work recognition), (2) factors linked to pedagogical monitoring (pedagogy, health and safety, emotions and attractiveness); (3) factors linked to social and work-related organization (collaboration, communication, the reorganization of communicative practices), (4) factors linked to the tool's use and deployment (ease of use, usefulness, feedback, computer and network equipment, support and assistance). We will first present the results that stemmed from the four main factors; we will then proceed to describe the sub-factors.

5.1 Main Factors

In Table 1, we can see that the factors linked to social organization brought about the largest number of positive comments (88), which means that the VLE played an important role in communication and collaboration practices within the school activity system. Conversely, factors linked to the teaching profession and to the use and deployment of the VLE gathered the largest number of negative comments. The deployment and use of the VLE therefore seem to raise questions linked to professional recognition and to the practice of the teaching profession. It also raises issues regarding the alignment of VLEs with school uses and habits. In the following paragraph, we present an analysis according to each sub-factor (see Table 2), thus allowing us to refine each element.

Table 1: Main Factor Occurrences.

Factor	Number of positive comments	Number of negative comments
Profession	35(15,56%)	90(36%)
Pedagogical follow-up	54(24%)	57(22,8%)
Social organisation	88(39,11%)	14(5,6%)
The tool's use and deployment	48(21,33%)	89(35,6%)
Total	225(100%)	250(100%)

5.2 Factors Linked to the Practice of the Profession

As we can see in Table 2, the perceived workload (triggered by the use of the VLE) brought about the largest number of negative comments (72). In fact, teachers had the impression that they needed to invest additional time to master the VLE's functionalities and to imagine interesting projects to do on the platform. They also felt that using the VLE

implied sustained and continuous work for new tasks that did not necessarily fit into their areas of expertise, such as: taking pictures, downloading material on the computer and then on the VLE, publishing blog posts, writing messages, and designing teaching projects that included the VLE. Since these teachers did not have a dedicated time slot to use these technologies, they had to use pedagogical time to become familiar with such tools. Teachers also felt the weight of large workloads, with the impression of having an ever increasing amount of informational solicitations. The VLE had indeed been added to a number of pre-existing educational platforms: academic e-mail, the career management platform "I-prof", online training platforms, didactic platforms and an online handbook of skills. Teachers therefore felt constantly submerged by a large amount of data which they had to manage (email addresses, different login names and passwords for each platform, various approaches and functions according to the different resources...). They also felt overwhelmed by the informational content that they had to focus on and prioritize (academic information, pedagogical information, event notifications to sort and share...). Faced with the fear of having to work twice the amount with a VLE, some teachers refused to publish their lessons on the VLE since they already did the same thing using their own automation tools: "*I already create the lesson on "paper board", so putting it up again (on the VLE)... I do not want to do that...*"

Teachers made 20 positive comments about making students more responsible when using digital tools. Teachers found that they had a part to play when training "*students to use digital tools responsibly*". On the other hand, some teachers found that parents should be in charge of raising their children's digital awareness (12 comments). These teachers' main arguments had to do with the fact that working on the students' digital responsibilities affected other teaching activities negatively. They also argued that such digital tools were massively consulted by the children at home, such as when they checked new messages. For these reasons, controlling digital tools should relate to the private sphere. This opinion was not necessarily shared by parents who believed that, on the contrary, the follow-up on digital practices should be done by the institutions that set up the tools in the first place. We can therefore see that, within the "school-home" axis, responsibilities and roles between teachers and parents may need to be redefined within the teaching program, and the division of work would need to be more efficiently coordinated (controlling and following up on uses).

Work recognition was mentioned positively 15 times. Some teachers saw the VLE as a way to highlight classroom work through the blog. Some activities, which had previously been almost invisible to parents, could now be displayed, such as sporting activities, class outings, and the work of the pupils themselves. The VLE then became a tool that could help recognize the teacher's and the students' work. But such recognition is still limited due to parents not being fully involved in the VLE project and not consulting these resources often (negative mentions).

5.3 Factors Linked to Student Monitoring

According to the teachers, the primary benefit of VLEs for students lied in the fact that VLEs helped to build a more attractive and stimulating relationship based on emotions (30 positive comments in Table 2). The VLE was a motivating tool for students and allowed them to appreciate class work. In terms of pedagogy, the VLE was seen as a benefit (20 positive comments) in the construction of verbal expression and student communication. It was also positively viewed to raise awareness and autonomy when students were working with computers. The VLE blogs were therefore often co-edited by the teachers and the students.

However, teachers also expressed many fears linked to the children's health and safety (57 negative comments versus 4 positive ones). These fears related more specifically to possible abuses (bullying, insults) or to the misuse of communication and coordination tools. Teachers did not gave any access to the children's accounts and were therefore unable to control the content of exchanged messages. Several teachers created a fictitious student account to follow and control exchanges. This also allowed them to check the layout quality of the information and documents that they published on the VLE. We noticed that the teachers who had not used the platform in such an innovative way weren't as satisfied with the device. This example highlights the importance of offering verification and surveillance functionalities for the teachers, with parent or student views available. Another fear related to ways in which the children themselves could use the VLE in transgressive ways. It is particularly difficult for teachers to authenticate information coming from the system, as the following example shows: "*I received a parental message, I do not know if it was the older brother or*

the parent who sent the message.../... so I needed to go back to the paper notepad to write a note.../... on the notepad, there's the handwriting, the signature, we can quickly tell the difference between a parent and a child".

Table 2: Sub-factor Occurrences.

Sub-factor	Number of positive comments	Number of negative comments
Factors linked to the practice of the profession		
Workload	0 (0%)	72 (28,8%)
Raising awareness on digital uses	20 (8,89%)	12 (4,8%)
Work recognition	15 (6,67%)	15 (6%)
Total	35 (15,56%)	90 (36%)
Factors linked to student monitoring		
Pedagogy	20 (8,89%)	0 (0%)
Health and safety	4 (1,78%)	57 (22,8%)
Emotions and attractiveness	30 (13,3%)	0 (0%)
Total	54 (24%)	57 (22,8%)
Factors linked to social and work-related organization		
Collaboration	12 (5,33%)	0 (0%)
Communication	72 (32%)	8 (3,2%)
Reorganizing communicative practices	4 (1,78%)	6 (2,4%)
Total	88 (39,11%)	14 (5,6%)
Factors linked to the tool's use and deployment		
Ease of use	27 (12%)	24 (9,6%)
Usefulness	9 (4%)	6 (2,4%)
User feedback	4 (1,78%)	39 (15,6%)
Computer and network equipment	0 (0%)	6 (2,4%)
Support and assistance	8 (3,56%)	14 (5,6%)
Total	48 (21,33%)	89 (35,6%)

5.4 Factors Linked to Social and Work-related Organization

VLEs were particularly appreciated as a tool supporting communication (72 positive comments). Certain teachers, who created blogs, mentioned these blogs in the notepads when information needed to be consulted. Teachers seemed to appreciate the positive role that the VLE played in teacher collaboration (12 mentions). Sharing resources made it easier to organize common activities and outings, and facilitated pedagogical work.

Negative comments (8) addressed the messaging service as a communication method, highlighting the fact that this service did not distinguish between in-school time and out-of-school time. Teachers mentioned the need to change the settings so that parents could only send messages outside of school time and to limit school-time messages between students. Concerning the parents, such parameters would limit the amount of last-minute intrusive messages that require additional work on the teacher's behalf during class time. Teachers have more control using the parent-teacher notepad. Providing these settings could be useful as a first step. It would reassure teachers and would give them time to set-up digital awareness activities for students and parents.

5.5 Factors Linked to the Tool's Use and Deployment

Teachers reported finding the platform user-friendly (27 positive comments). They considered the functionalities and information coherent and easily accessible through the menu and the icons. The negative comments (24) were linked to the functionalities in the VLE's Document space: teachers would have liked to share folders rather than files: *"the children receive... [the files] just like that. It is not easy for them, we have a Shared Document and everything is mixed together: music, stories. If the name of the folder is a bit vague, they will not know"*. There was also a lack of visibility as to who consulted content and who connected to the platform. By following the news feed, teachers managed to see the activity of other users (parents, students), but only if the latter had modified a certain feature, such as their avatar or their motto. But feedback could not be retrieved when users simply consulted the platform without leaving tangible traces. *"It is true that... if they do not change their mood or their motto, we do not know if they have connected or not. It would be interesting for us users to know who saw the content"*. In order to obtain such data, teachers had to do an additional task which consisted in sending a questionnaire through the parent-teacher notepad or by asking the students if their parents had connected to the platform. Such feedback was important in order to build ties with the different educational partners and to make sure that the published information had actually been seen and received. Otherwise, teachers had difficulties knowing if the system was really useful and effective.

The lack of computer infrastructure (equipment, networks...) was also seen as hampering the acceptance of VLEs (6 comments). Teachers would have liked to use the VLE in class with the students but they did not have enough computers and tablets. "*we would almost need to have computers in the class all the time to really use (VLEs) in every day*

teaching". Teachers also pointed out that all students did not have equal access to VLEs: some had continuous access, while others had restricted access through their parents; some students did not have Internet access at all. Finally, teachers mentioned a lack of support and assistance. They did not feel adequately trained to use VLEs. Given the fact that this was an experimental implementation phase, not all possible means were used to support the teachers. On the long term, academic supervisors would need to get involved in training and supporting teachers.

6 DISCUSSION AND CONCLUSION

We noticed that, in terms of acceptance, the uses of the VLE spurred tensions that were similar to the ones described by Prieur and Steck (2011) and Voulgre (2011) in secondary education. We observed contradictions between the artefact, the community and the rules as well as contradictions between the artefact and the division of work. The first type of contradiction was linked to the subverted uses of the Messaging Service or the News Feed. There was also a lack of digital access due to poor infrastructure in schools and in some homes. The second type of contradiction was due to an excessive workload and an increase in the teachers' professional responsibilities through the extension of the "school space-time continuum". We recommend that decision-makers (the Ministry, school districts) provide better information on VLE users' responsibilities. When it comes to community uses – such as the ways in which to use the messaging service or whether or not use feedback indicators– we think that such decisions can be made at a local level through discussions between the school administration, the teachers and the VLE publisher. Depending on contexts and practices, certain modes of operation may or may not be effective or acceptable.

There were fewer contradictions linked to the artefact itself. Teachers appreciated the services offered by One as well as its ergonomics; they tried to adapt the VLE to their professional practices. They did not hesitate to make requests to improve the tool. They also agreed to help train children and their parents on digital best practices. Teachers showed signs of acceptance in this area, but they still need to be given more support and assistance to maintain such uses on the long term.

To conclude, the acceptance of this VLE seems to have been overall positive since One was well designed and relatively adapted to the practices of the teachers involved. The main problems are linked to the ways in which the tool is implemented. The recommendations formulated here are meant for the Ministry of Education and school principals. Clarifications need to be made concerning the limits of the school space-time continuum and the rules of governance and communication. Such resolutions are relevant in a context in which very young children are concerned, since they are to use these platforms without having prior social digital skills.

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