Courses with virtual supports. Relations between students' perception and participation willingness (A 3 cases' study in higher education)

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1 Purpose of the study

After a period of "hype" for the implementation of new information and communication technologies (ICT) in learning environments, a more reflexive moment develops now, with an effort to understand why those implementations successfully happen or not (Tergan, 1997, 2002).

This paper presents a part of the analysis made with 3 courses using virtual supports (hereafter called hybrid) held at the University of Fribourg (Switzerland). We explore the possible relations between students' willingness to attend other courses with virtual supports, and their perceptions concerning different aspects of the hybrid course. This variable, called global acceptance, is evaluated at the end of a hybrid course.

Then we divide our students in two groups depending on their willingness to attend other courses with virtual supports. We compare the perception of the two groups of students concerning different aspects of the courses, in order to explore possible factors influencing their positive or negative attitude towards hybrid elearning courses. We want also to determine if there is a relation with the willingness to attempt other courses with virtual supports.

2 Methodology

According to the taxonomy of De Ketele (1996), this analysis is an exploratory research work aiming at a better comprehension and formulation of hypothesis concerning factors influencing students' attitudes versus elearning courses. It is based on previous formative evaluation of projects developing elearning resources for hybrid courses. The continuous formative evaluation and research of hints to improve elearning and hybrid courses is a task of the NTE Centre of the University of Fribourg (Platteaux, 2004).

2.1 Data gathering tool

Our data are gathered with a questionnaire, developed on a previous research (Zahnd & al. 1998) and adapted to fit the needs of the formative evaluation of the projects that NTE Centre supports. It contains the factors that a literature review showed as key elements of a course evaluation. There are the perceived degree of use of the course resources and the perceived usefulness for learning of the course resources (Tricot & al., 2003). There are also quality and quantity of learning compared to a traditional course, ability to identify course objectives, estimation of time investment for the course, usability of resources, communication processes, objectives' identification, organization of time and perception of specific contents and tools used for the courses (Thompson 1987; Ragan 1999). The questionnaire reflects the student perception of the attended hybrid course (Williams, 2002).

The core of the questionnaire remains the same for all courses, so to enable a crossover analysis, as the one presented here. But the questionnaire was also adapted to the specificities of the evaluated courses and, in some degree, to the needs of the teachers / project leaders, who had specific requests concerning the evaluation of their course.

2.2 Courses and population

We gathered data from three classes held in 2003-04 at the University of Fribourg: "Psychologie de l'adolescent" (35 students – Educational Sciences) and two Swiss Virtual Campus projects: "Antiquit@s" (45 students – Historical Sciences degree) and "Embryology" (57 students – Medical Sciences degree). First and second year students attempted the three courses.

These courses have a hybrid pedagogical scenario (Charlier, Peraya & Deschryver, 2006), alternating moments of face-to-face interactions (more or less participative) and distance work supported by virtual resources (individual or group work). The three analysed courses belong to the scenario category of ICT use to support and improve the F2F teaching/learning (Peraya, 2006).

The courses were already held prior 2003-04, formatively evaluated and improved, so we can assume they had an acceptable quality and exclude, or at least minimize, interferences caused by poor global course quality. The present article completes previous analysis of different courses – "Antiquit@s" (Platteaux & Dasen, 2004), "Embryology" (Platteaux & al., 2003; Platteaux, H., Hoein, S., & Adé-Damilano, 2004) – and a first cross-analysis of the same courses (Hoein & Platteaux, 2006).

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3 Results and discussion

3.1 Global acceptance

At the end of their elearning course, we asked the students, if they would attend other courses with virtual supports. A positive answer is estimated as a global acceptance, with the assumption that this attitude of a person shows she accepts hybrid courses with virtual supports.

Results show that about 66% of our students are favorable, and more than 33% would not take another course of this kind. Even if this variation between courses is not statistically significant (chi2 = 2.275, df 2, p. not sign.), we can see differences. If the Embryology students split in half, the Psychology students seem quite more favorable to their course scenario. Antiquit@s students are situated between the other two (see Figure 1).

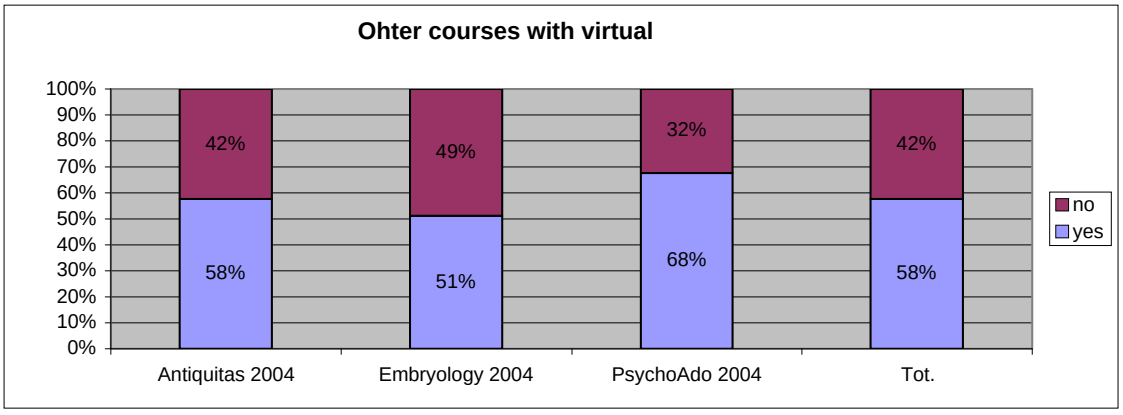

Figure 1: Would you attend other courses with virtual supports?

We divide our students in two groups depending on this variable in order to see how they evaluate their experience in the hybrid course they attended. The background question is: for what variables is there a difference between the two groups? We would like this way to find hypothesis concerning the factors that influence global acceptance of a hybrid course situation. Then, for our analysis of the different variables, we always dichotomized the answers to cross them with the results about general acceptance, creating series of 2x2 crosstabs (see annexes).

3.2 Use of course resources

We asked students how much they used the different course resources. And we didn't find statistically significant relations, for any of the three courses, between the perceived

use of the course resources by students and their willingness to attend other course with virtual supports after the one they just attended. Our two groups of students express more or less the same degree of use for the major resources (Annexed Table 1). However some small differences were found between the two groups for singular elements, in one course or another, but with no statistics' significance.

This can be interpreted as a little surprise. One could indeed expect a relation between these two variables. If someone uses the resources of a course, he could like them and/or get familiarized with them, then more wanting to continue using them in other courses, after having done the effort of learning to use them. This is not the case for our students. The resources were quite well used (with variations and exceptions of course) but it seems not to influence the willingness of following other courses with similar tools. For sure the use of the resources was recommended by teachers. Then a sort of "social pressure" could influence the global use, as resources' utility could do. And one hypothesis can be made to explain the lack of relationship we found. Students used the resources needed in a course, not being aware of their possible use for other courses.

3.3 Utility of course resources

Within the perception of students about the resources' utility for learning in the course, we don't find statistically significant relations with the willingness of students to attend other courses with hybrid supports (Annexed Table 2), except for the Website globally (chi^2 6.624, 1 df, p .010) and the eBook content (chi^2 4.884, 1 df, p .0270) of the "Antiquit@s" course.

As for the resources' use, we could expect an influence of the course resources' utility. If a student perceives the resources as useful for his learning, he should be more willing to use them in future courses. This seems to be the case for "Antiquit@s" course Website and his theoretical content, but not for the other resources and courses.

Following the Technology Acceptance Model (Davis, 1986), also adapted for learning (Selim, 2003), the perceived utility of a tool can influence the willingness to use it when needed as found by Ma, Anderson and Streith (2005). Our results do not align. We can make the hypothesis that students make distinction between courses, and are aware that a resource can be useful in a course scenario but not in another.

3.4 Learning amount: elearning vs. "traditional" course

We asked students to evaluate the amount of learning achieved during the hybrid course, compared to a more traditional course, without ICT. Figure 2 shows how students' willingness of attending other future courses with virtual supports is related to

their perceived amount of learning in the course (compared to "traditional" courses). A significant relation is found for two analyzed courses: "Antiquit@s" (chi^2. 13.407, 2 df, p .001, phi_c .571) and "Embryology" (chi^2 5.909, 2 df, p .052, phi_c .358). For the course "Psychology of Adolescents" the relation is not statistically significant.

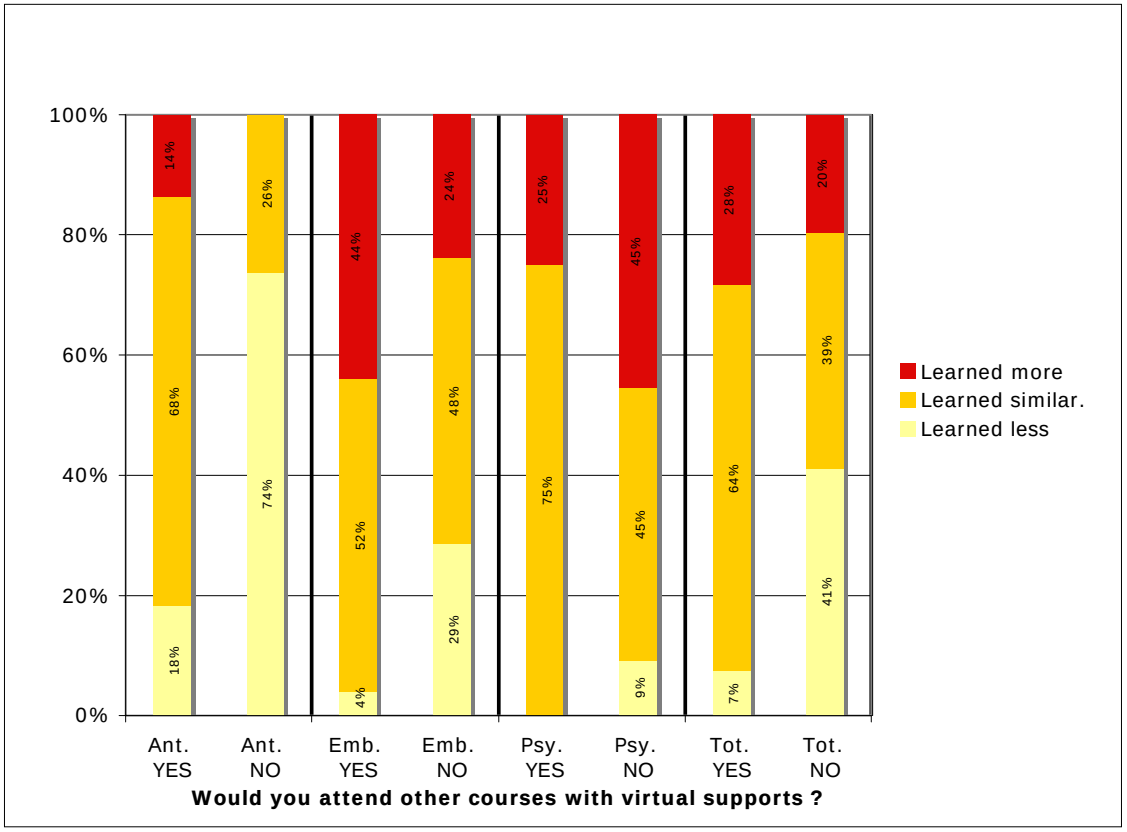

Figure 2: Students perceived learning achievement (quantity) in the elearning course vs. a "traditional" course. Distribution of the 2 groups: would (left columns) or wouldn't (right columns) take other courses with virtual supports

We can so make the hypothesis that if students estimate to learn more in a hybrid course than in a traditional one, they will be more likely to attend other hybrid courses. This makes sense because usually, in a university course, there is a big amount of materials to learn. Then, if virtual supports help to learn more of them, students should want them in their courses.

The exception of the psychology course perturbs this assumption. Even if not statistically significant, it shows an opposite trend. A trend of students, who declare not wanting to attend other courses with virtual supports, is to declare learning more. In this case, perhaps other factors intervene, other hybrid scenarios' aspects that those linked to elearning.

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3.5 Learning quality: elearning vs. "traditional" course

We asked students to evaluate also the quality of their learning in the hybrid course compared to a traditional one.

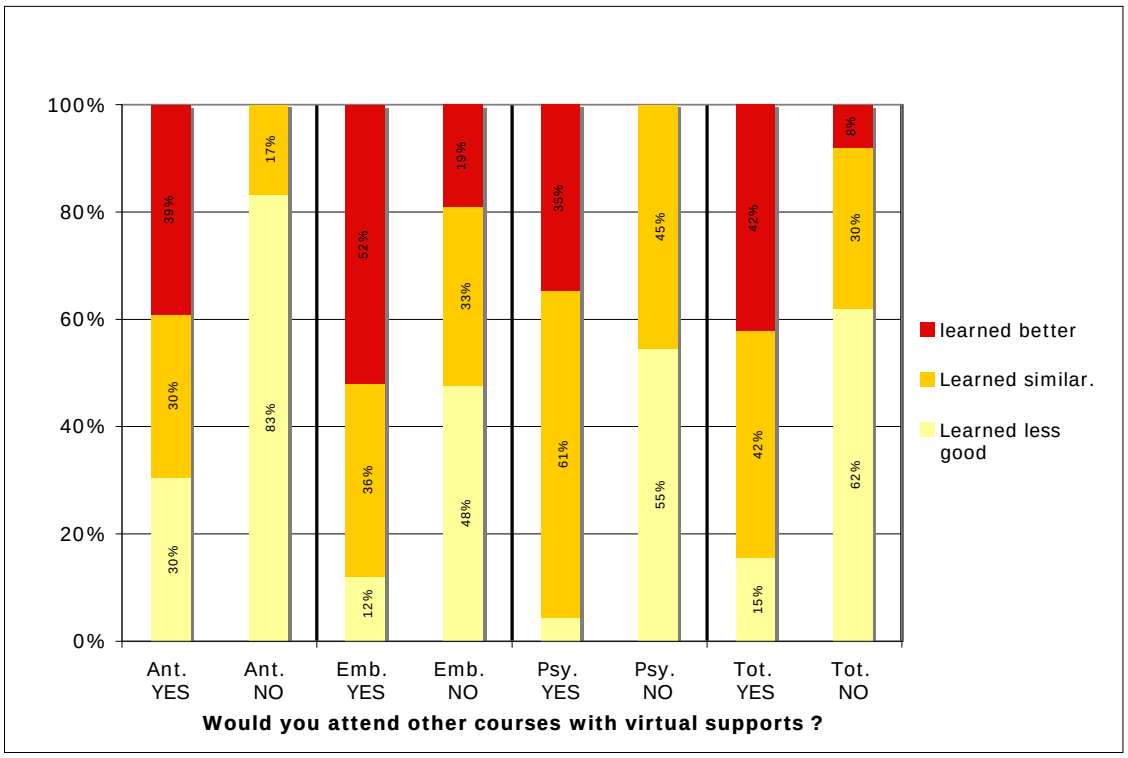

Figure 3: Students perceived learning quality in the elearning course compared to a "traditional" course. Distribution of the 2 groups: would (left columns) or wouldn't (right columns) take other courses with virtual supports

Similarly than for the amount of learning, students' willingness to attend other courses with virtual supports is related to their perceived quality of learning (Figure 3). This is found for all the three analyzed hybrid courses: Antiquit@s (chi^2 13.094, 2 df, p .001, phi_c .565), Embryology (chi^2 8.500, 2 df, p .014, phi_c .430) and Psychology of Adolescents (chi^2 13.250, 2 df, p .001, phi_c .624).

Here we make a hypothesis. Students, who perceive to learn better in a hybrid course, are more willing to attend other courses with such a scenario. It could be interesting to confirm this hypothesis for other courses.

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3.6 Ability to identify course objectives

We asked students if they were able to identify course objectives for the hybrid course they attended. The declared ability of students to identify course objectives seems not to be related with their willingness to attend other courses with virtual supports, except for the "Antiquit@s" course (chi^2 5.103, 2 df, p .023, phi .340). But we see that the majority of students are able to identify course objectives, even if this tendency strength varies between courses.

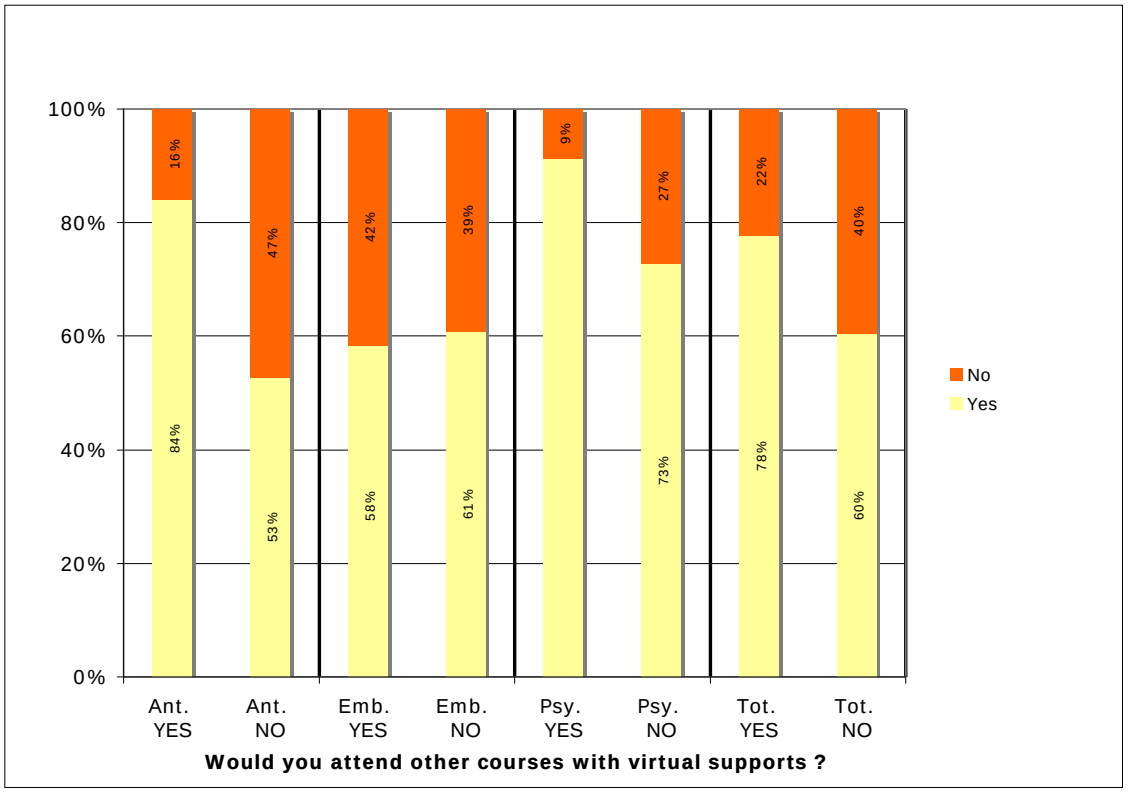

Figure 4: Students perceived ability to identify course objectives. Distribution of the 2 groups: would (left columns) or wouldn't (right columns) take other courses with virtual supports

It would be interesting to see if this lack of relation is also found in courses where the ability of identifying learning objectives is more heterogeneously distributed among students. But we will not create, on purpose, such a negative effect in real courses that would mean lower quality courses.

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3.7 Time investment

We asked students to make a subjective estimation of time quantity they had to invest in the course, from very low to very high. A preliminary study of our students' population showed they had no (or very few) experience in course with virtual supports. This indicates they will refer mostly to a prior learning experience that was developed in traditional courses.

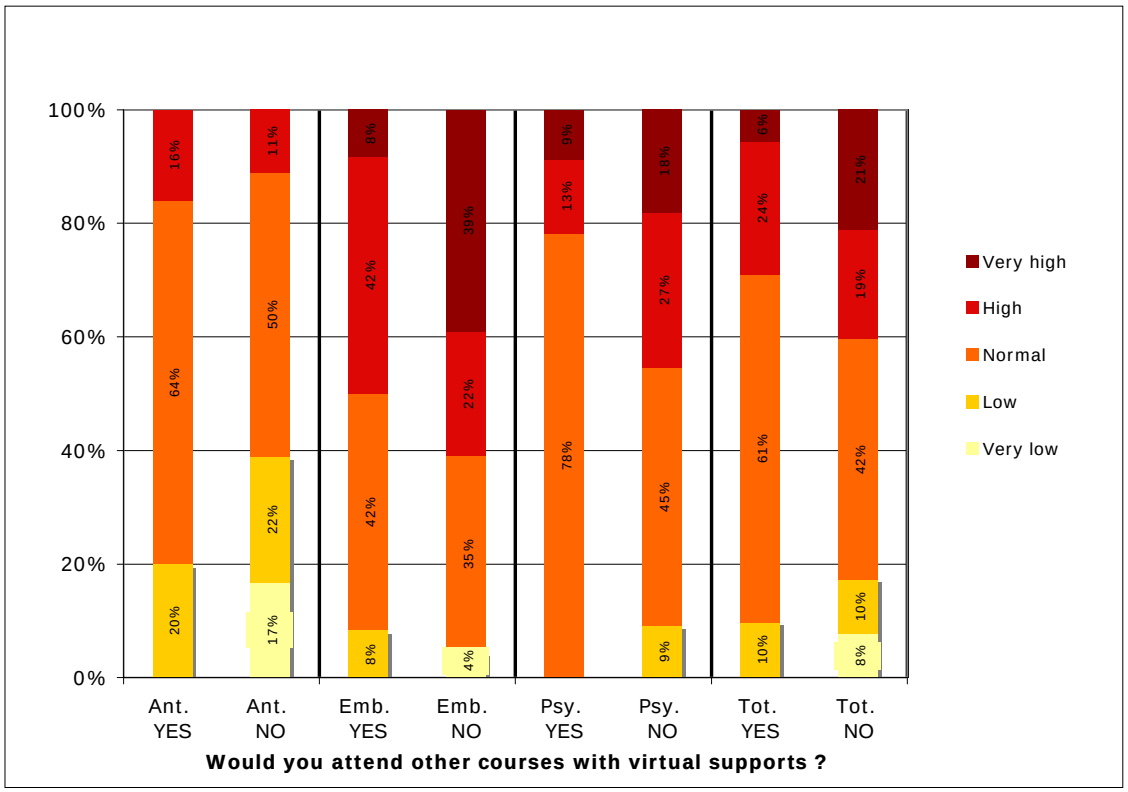

Figure 5: Students perceived time amount invested in the course. Distribution of the 2 groups: would (left columns) or wouldn't (right columns) take other courses with virtual supports

The results show no statistically significant relationship between the subjective time load perception of students and their willingness to attend other courses with virtual supports (see Figure 5), except for the "Embryology" course (chi^2 9.326, 2 df, p .053, phi_c .445).

Students tend to evaluate the work time quantity as normal or high. Only a minority of students estimate the time investment for the course as low or very low. This is not surprising because they have to adapt their learner job. They learn with tools that they are not used to. This doesn't seem to influence, at least for two of the three analyzed

courses, the willingness to attend other courses with virtual supports. This is rather good news.

We don't have a clear explanation for the reasons of this absence of relation. Further exploration could be interesting. At least we can make the hypothesis that time investment is accepted by students when perceived as "a little more than normal" if their schedule isn't overcharged. This would explain the significant relation for the "Embryology" students. In fact, medicine first year students have a very charged course schedule which leaves them little time to get familiar (motivated and efficient) with new learning environments and tools. The curriculum schedules of the two other analyzed courses leave more time for exploration. This may facilitate the familiarization with new elearning tools and the associated new learning processes. A feeling of big work duration can have an impact on global perception of a course (Platteaux, 2003). But, it may also depend on another variable: the load of course or degree schedule. This is of course only an assumption which needs to be confirmed by further exploration.

3.8 Indications for time organization

We asked students if the indications (concerning time organization) were clear enough to allow them an efficient organization of their work schedule. As we can see in Figure 6, there are differences between courses concerning this point. The majority of "Antiquit@s" and "PsychoAdo" students found these indications clear enough. The "Embryology" students split in two equal groups.

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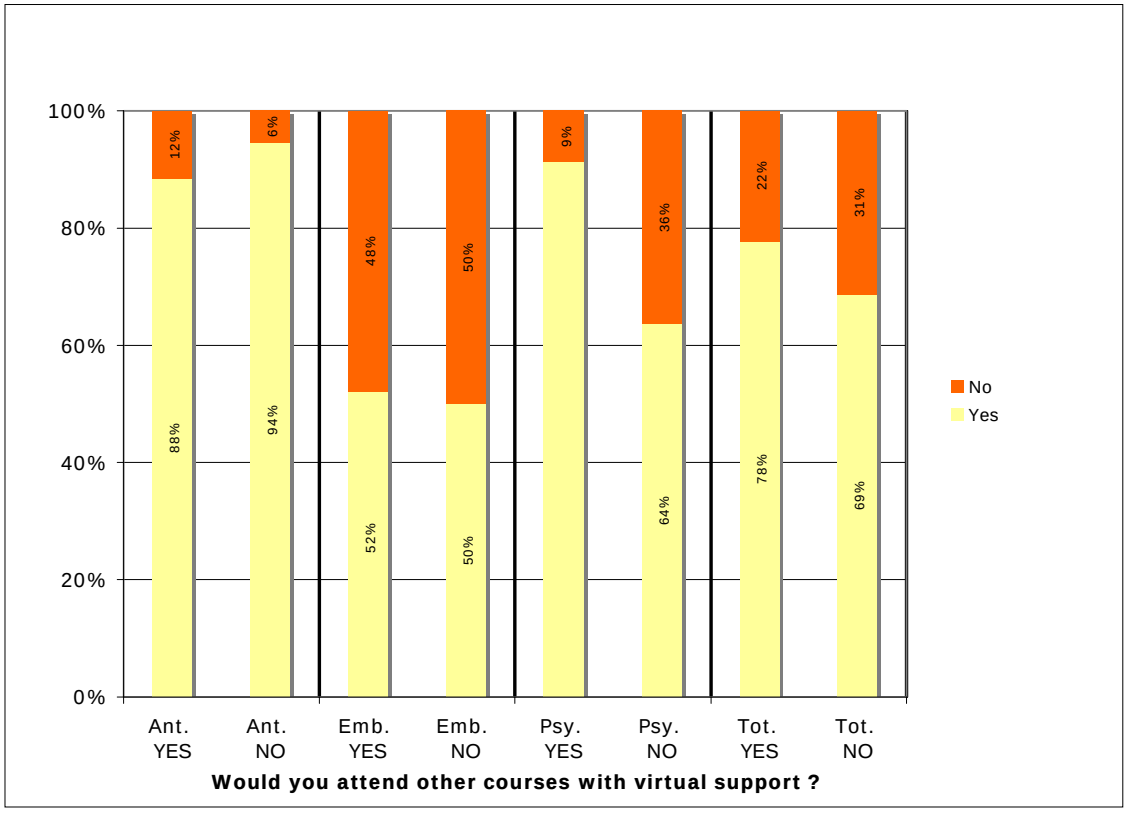

Figure 6: Students perceived clearness of time management indications. Distribution of the 2 groups: would (left columns) or wouldn't take other courses with virtual supports

Crossing these results with the student's willingness to attend other courses with virtual supports, we find a statistically significant relation only for the "PsychoAdo" students (chi^2 3.920, 2 df, p .048, phi .339).

Our result confirms partially that time management can influence the acceptance of an elearning course situation (Herriot & al., 2004). But, even if the indications for time management are perceived differently by students of different courses, this perception doesn't seem to influence systematically their willingness to attend other hybrid courses.

4 Conclusion

We analyzed answers from first and second year students who attended three hybrid courses at the University of Fribourg. The courses are labeled as hybrid because they mix traditional and virtual resources and activities. In this exploratory analysis, we hy-

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pothesized about possible reasons for students' willingness to attend other future courses with virtual supports.

As found by Gurtner and his colleagues (2003), in a learning situation, a tool acceptance is high when efficient for learning. Also, for the students, a success factor of elearning tools is identified as being their efficiency to prepare exams (Glatz, 2005). Our results show that students' willingness to choose further hybrid courses is significantly related to the quality and quantity of learning they perceive (compared to a "traditional" course).

Other course variables show a relation, but depending on courses. We find a relation between the willingness to attend other courses with virtual supports and:

- the ability to distinguish course objectives for the "Antiquit@s" course;
- the perceived usefulness of Website and E-Book contents also for the "Antiquit@s" course;
- the perceived clearness of indications concerning organization of time for the "Psychology of Adolescence" course.

No relation was found between the willingness and the perception of course elements' use, course elements' usefulness (except the one shown before), and evaluation of time load for the course.

Further researches should explore reasons influencing the building of students' willingness and motivation to attend hybrid courses (with virtual supports). We make the hypothesis that this willingness is building up with hybrid courses' experiences and is influenced, positively or negatively (Hahne & al., 2005), by them. This concerns both the attitude towards computers (Dewhurst, Macleod et Norris, 2000) and learning with them. Speaking of her elearning experiences, a student declared that every confrontation with a concrete situation of learning with ICT builds up her opinion concerning these tools (Mela, 2005).

As information and communication technologies are more and more present in higher education courses, it is interesting to identify factors motivating students in those hybrid courses, in order to further explore and improve the implementation of ICTs as a help for teaching and learning.

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6 Annexes

Course elements		Would take other courses with virtual supports. (GA YES)			Wouldn't take other courses with virtual supports. (GA NO)		
Perceived Use (PU)	N Tot.	N GA YES	UE > (% of GA YES)	UE < (% of GA YES)	N. GA NO	UE > (% of GA NO)	UE < (% of GA NO)
ANTIQUITAS							
Website	40	23	70%	30%	17	71%	29%
Forum	40	23	43%	57%	17	41%	59%
Email Teacher	41	23	4%	96%	18	11%	89%
Email Students	40	23	9%	91%	17	12%	88%
EBook content	41	23	78%	22%	18	67%	33%
EBook activities	41	23	61%	39%	18	61%	39%
EMBRYOLOGY							
Website	48	24	88%	13%	24	83%	17%
Forum	47	24	13%	88%	23	4%	96%
Chat	48	24	4%	96%	24	0%	100%
Email Teacher	47	23	9%	91%	24	0%	100%
Email Students	48	24	4%	96%	24	0%	100%
Modules Theory	49	25	84%	16%	24	79%	21%
Modules Quizz	48	24	75%	25%	24	58%	42%
Modules Schemes	48	25	72%	28%	23	57%	43%
Distance Exchange Zone	47	24	25%	75%	23	22%	78%
PSYCHO ADO							
CDRom General	34	23	74%	26%	11	64%	36%
CD Challenge	34	23	87%	13%	11	82%	18%
CD Modules	34	23	52%	48%	11	55%	45%
Support Site	34	23	13%	87%	11	0%	100%
F2F Seminar	34	23	57%	43%	11	73%	27%
Email Teacher	33	22	0%	100%	11	0%	100%
Email Students	33	22	5%	95%	11	0%	100%

Table 1: Crosstabs 2x2 Global acceptance (GA) – Perceived use of course elements (UE: > use or great use, < poor or no use)

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Course elements		**Would** take other courses with virtual supports. (GA YES)			**Wouldn't** take other courses with virtual supports. (GA NO)		
Perceived Usefull-ness (PU)	N Tot.	N GA YES	UE > (% of GA YES)	UE < (% of GA YES)	N. GA NO	UE > (% of GA NO)	UE < (% of GA NO)
ANTIQUITAS							
Website	39	23	78%	22%	16	38%	62%
Forum	40	23	39%	61%	17	29%	71%
Email Teacher	36	19	84%	16%	17	65%	35%
Email Students	29	15	67%	33%	14	57%	43%
EBook content	39	23	78%	22%	16	44%	56%
EBook activities	39	23	61%	39%	16	38%	62%
EMBRYOLOGY							
Website	45	25	72%	28%	20	55%	45%
Forum	22	10	20%	80%	12	33%	67%
Chat	8	4	25%	75%	4	0%	100%
Email Teacher	18	10	40%	60%	8	75%	25%
Modules Theory	46	25	84%	16%	21	67%	33%
Modules Quizz	42	23	87%	13%	19	84%	16%
Modules Schemes	45	25	80%	20%	20	75%	25%
Distance Exchange Zone	35	20	45%	55%	15	47%	53%
PSYCHO ADO							
CDRom General	34	23	70%	30%	11	46%	54%
CD Challenge	33	22	73%	27%	11	46%	54%
CD Modules	33	23	57%	43%	10	50%	50%
Support Site	15	9	56%	44%	6	50%	50%
F2F Seminar	31	20	85%	15%	11	82%	18%
Email Teacher	3	2	0%	100%	1	0%	100%
Email Students	4	3	67%	33%	1	0%	100%

Table 2: Crosstabs 2x2 Global acceptance (GA) – Perceived usefullness of course elements (UE: > usefull or very use, < little or not usefull)

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