

Self-Steered Learning by Using New Media in Technical Lessons at the Higher Vocational School of Horticulture

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The professional practice of a higher vocational school graduate in horticulture requires a high degree of vocational decision-making and responsibility. It does not matter what the task is, whether it concerns the planning and carrying out of cultural activities or taking on and processing contracts and orders, problem-solving strategies and also communicative abilities are always demanded. In this context, obtaining information and communicating with colleagues is nowadays, in particular, based on the usage of new media. By now, using the internet and exchanging information via e-mail or forums have become a natural course of action. The competency to acquire and use specialised knowledge purposefully (methodical competencies) is inseparable from the usage of media like the computer which are used for this purpose (media competencies).

Why should new media also be used in technical lessons?

Methodical and media competencies have a considerable influence on developing specialist competencies and using acquired knowledge successfully (cf. KLIPPERT, H., 2004). Therefore, developing specialist, methodical and media competencies simultaneously, as parts of vocational decision-making and responsibility, should be an immanent part in modern vocational education when preparing students for their working life. The students, as future people responsible, have to be able to develop problem-solving strategies for specialist tasks self-directedly and to use the (new) media needed for that effectively. Besides reading, writing and arithmetic, being able to use the computer will become a major cultural technique. Just as you cannot do without paper, pencil and calculator in technical lessons, the computer, as a tool to obtain, process and present information, should not be disconnected from specialist contents. The computer is not in the centre of attention as subject matter but it is a means to an end. The development of the necessary methodical and media competencies of the students should not only be done in EDP and IT lessons but should also be integrated in technical lessons. As a result, using the computer in technical lessons can perfectly support and make demands on the development of Self-Steered Learning of students.

What means Self-Steered Learning?

According to HUBER, L. (1999), Self-Steered Learning is both, the means in the learning process and aim of the learning process at the same time. The students shall become more and more capable of taking responsibility for their learning themselves, widening their competencies when dealing with challenging tasks, dealing with their abilities in a productive way in order to develop lasting learning competencies. Such understanding of education does not only aim at independence and autonomy but also at the development of the ability to cooperate and to work in a team (cf. HUBER, L., 1999). Hence, Self-Steered Learning provides a basis for lifelong learning which, through constant developments and innovations, has also become essential in the field of agriculture and horticulture.

How can Self-Steered Learning be realised with the help of new media?

For students at higher vocational schools of horticulture, Self-Steered Learning with the computer will be realised within action-oriented teaching and learning arrangements (Lehr-Lernarrangements = LLAs). The LLAs create perfect basic conditions for the learners' active process of acquirement, meaning the interaction of learning situation, structuring lessons, assigning tasks, providing information and media, methodical guidance, learning activity, advising students on their way of learning and checking results (cf. BRÄUER, M., 2004).

After a short introduction by the teacher, the students in such LLAs are put in a realistic learning situation with the help of a 'scenario' and get a collective, complex assignment. The students will first work on the assignment with the help of central questions, each working group dealing with one aspect of the assignment. The groups consist of 'computer experts' and 'computer laymen' who choose their topic and working methods themselves and support each other. As a help, each group gets a folder with information about what they have to do and material of their topic. Networked computer with internet access, selected software (Internet Explorer, MS Word, MS PowerPoint, MediaWiki) and peripheral devices (printer, projector) are used as a medium to obtain and process information and to present the results. During the whole elaboration phase the teacher takes on the role of a counsellor and facilitator in the learning process. After this phase, the results of each group work will be presented, checked, discussed and evaluated in a plenary meeting. Finally, the partial results will be put together to an overall result referring to the collective assignment.

The LLAs are realised project-orientedly within one school day (four blocks). Regarding the time needed, one can establish a relationship to the curriculum in so far that two blocks are formally assigned to technical lessons and one to EDP lessons. One further block will be declared as 'method block'. The course of the lesson according to the example above is summarised in the following table (fig. 1). One block comprises 90 minutes.

Figure 1: Time line for the realisation of one LLA

25 minutes (in the 1st block)	Explanations to the school day
65 minutes (in the 1st block)	Searching for information
90 minutes (the whole 2nd block)	Processing of information
90 minutes (the whole 3rd block)	Presentation and verification of group-results
45 minutes (in the 4th block)	Estimating and benchmarking of group-results
45 minutes (in the 4th block)	Combining of group-results to an overall-result

Which specialist contents are suitable to realise this conception in lessons?

Working with new media should have an additional didactic value in comparison to traditional teaching methods. The computer can be motivational but also profitable regarding the aspect of illustration. Working with new media is especially useful when the subject matter cannot be observed in nature or through realities and when a great deal of capacity for abstraction is demanded from the students. After having looked through the curricula of the test schools from five different German federal states, the topics 'Photosynthesis' and 'Green Genetic Engineering' were prepared as LLAs, which were used in lessons on 'Basic Biological Knowledge of Horticulture'.

What were the results of the lessons where LLAs were used?

The LLAs were tested on 74 students from five different higher vocational schools of horticulture in six classes (A – F). Additionally, 12 teachers were included in the testings. Despite the class heterogeneity and the heterogeneity within a class (formal education from General Certificate of Secondary Education to higher education entrance qualification), the results did not differ much from each other.

Whether the students acquired methodical and media competencies or not was, among others, found out through questionnaires completed by students and teachers and through group interviews. Questionnaires were filled in before the teaching unit as well as afterwards. Furthermore, during the phase of working self-steered the students were observed individually according to defined criteria. Moreover, the existing or developed methodical and media competencies were examined and compared through preceding and subsequent tests.

The acquired specialist competencies were determined through specialised exams. The results of those exams ranged from 'excellent' (= 1) to 'satisfactory' (= 3) (cf. fig. 2). From the figure you can deduce that the subgoal of gaining additional specialist competencies was generally achieved.

Figure 2: Results of the specialised exams

Test class	LLA ,Photosynthesis'	LLA ,Green Genetic Engineering'
A	1,26	1,37
B	1,67	2,38
C	1,69	1,53
D	1,73	2,80
E	2,22	2,50
F	2,75	2,50
<i>Average</i>	<i>1,89</i>	<i>2,18</i>

The results of the questionnaires are similar for almost all questions. Referring to the self-assessments and assessments by others, almost every time you can see a shift to the right towards higher competencies after having done the teaching and learning arrangements (cf. fig. 3 and 4). This is an indication of the effectiveness of lessons given according to the example of the LLAs.

Figure 3: Self-assessment of students concerning one aspect of their methodical competencies

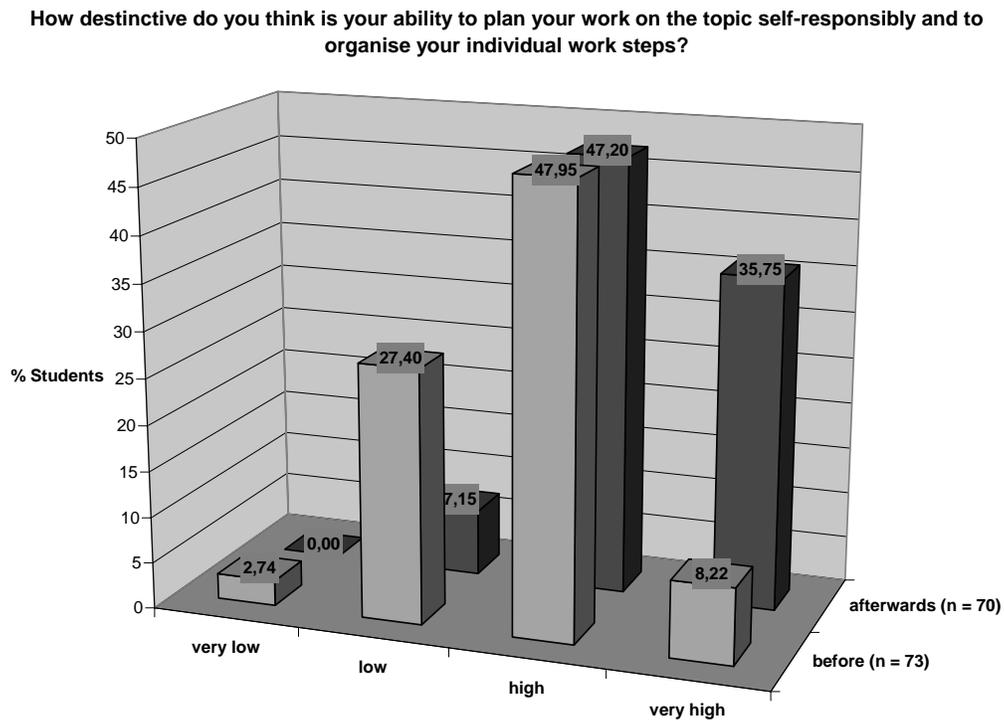
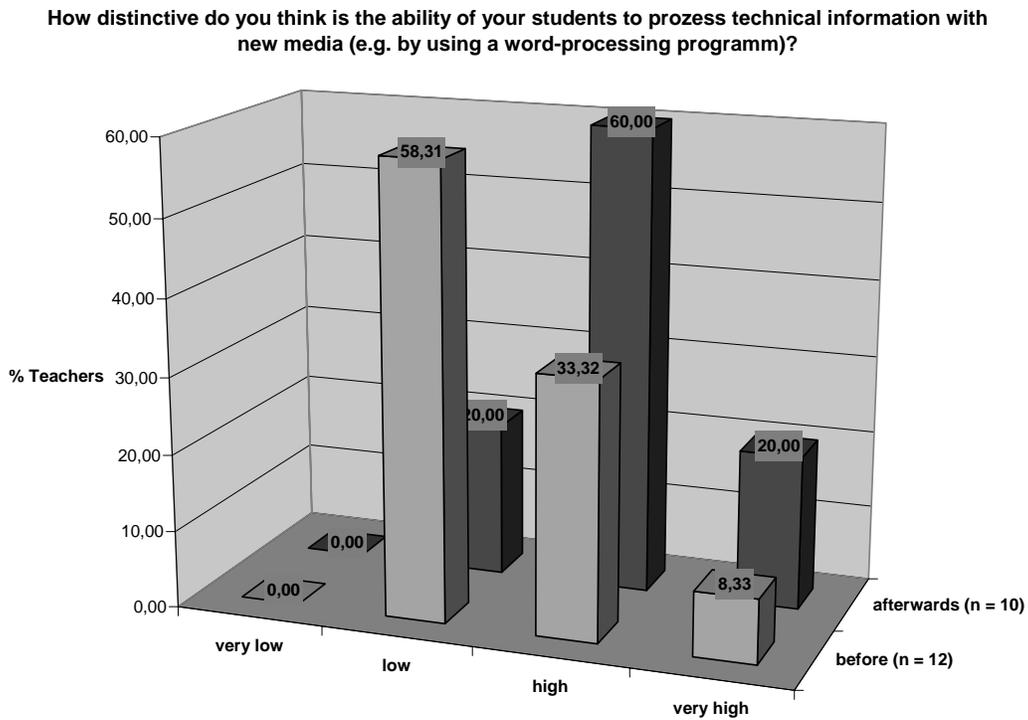


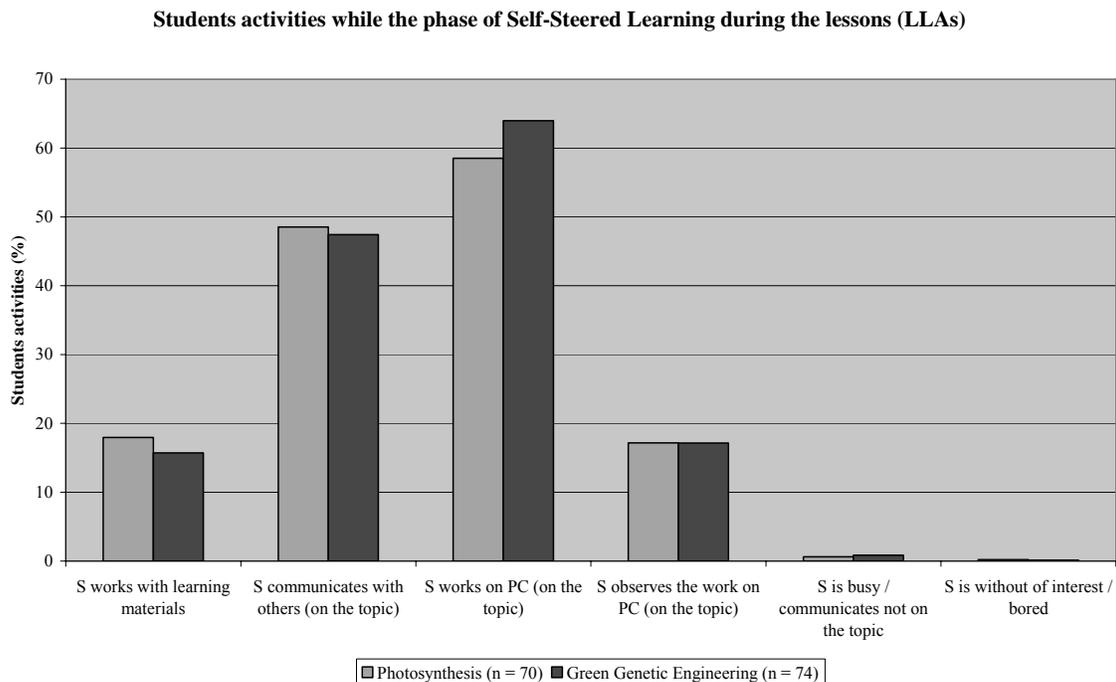
Figure 4: Assessment of teachers concerning one aspect of students media competencies



The analysis of the preceding and subsequent tests also supports the thesis that this teaching concept and the teaching and learning arrangements which are based on it are suitable for gradually developing Self-Steered Learning.

The analysis of the individual observations showed that, within the LLAs, the students intensively dealt with the specialist topics (cf. fig. 5). Hardly any activities not belonging to the actual assignment were noticed. Continuously and actively dealing with the subject indicates that the students were highly motivated, which can also be attributed to the conception of the LLAs.

Figure 5: Students activities while the lessons



Conclusion:

Most of the students worked in a noticeable disciplined and dedicated way. They achieved almost all specialist and methodical educational aims. However, in the questionnaires, some students supposed that they would have achieved the aim faster just with corresponding textbooks. They obviously did not realise that they also acquired other skills and competencies in addition to the specialised knowledge. They solved the problem without noticing, deciding which information on the internet was useful, practised presenting, sharpened their skills in evaluating performance and practised their organisational skill in a team. These key qualifications become more and more important in our world of work and are in particular always demanded from persons in leading positions.

References:

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