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Harms, G.J.

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

1995

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Harms, G. J. (1995). *Effecten van modulair beroepsonderwijs bij leerlingen: Motivatie en rendement*. s.n.

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MODULAR VOCATIONAL EDUCATION AND ITS EFFECTS ON STUDENTS' MOTIVATION AND SCHOOL CAREERS

SUMMARY

Problem

The idea of dividing curricula into independent units has played a significant role in discussions on reforming Dutch senior secondary education over the last decades. This study analyzes educational policy aims and theoretical knowledge as well as the results of two reported research projects. It therefore makes a (limited) contribution to answering the comprehensive question: What can modules offer secondary vocational education and its students in particular?

The scope of modular learning

expectations

Policymakers and educational institutes do expect many benefits from modular courses. One of the foremost reasons for advocating modular education relates to flexibility. Flexible vocational education is required because of several emerging trends: a growing heterogeneity of student population, a growing need from employers for diverse school-leavers' qualifications, and rapid changes in occupational content caused by technical and organizational developments in trade and industry, are just some of them.

Another reason concerns the assumption that modular instruction will bridge several well known gaps in vocational education such as the ones between theory and practice, between learning in school and learning on the job and between education and work as a whole. Modules can have a linking function. They are supposed to foster what we call 'vocational coherence' of subject matter and learning process.

A third reason refers to the wish to enhance students' motivation and school output, although how modules should contribute to this is seldom explained.

concept

Modular learning is not an unambiguous concept. Different descriptions of educational modules are available. Analysis of these leads to the conclusion

that a module is a unit of educational content as well as a unit of educational organization.

The following definition is proposed: a vocational education module is a self-contained, internally consistent and independent unit of the subject matter of a course, which also comprises guidelines for teaching, learning and testing in such a way that, by their mutual relations, these emphasize the independence of the unit. The unit's subject matter refers to an already existing group of related qualifications in an occupational context and teaching and learning activities pertain to theory as well as practice. Modular education consists of any possible combination of modules as defined. The organisation of a modular structure is also determined by the modules' size and uniformity in size, by the extent to which flexibility at various levels is desired and by demands and constraints emerging from the subject matter's structure and sequence.

plausible effects

Theory and research on modular related innovations show the possible effects of this type of learning on students, as far as learning outcomes, motivation and school output is concerned.

Self contained units may enhance students' motivation by retaining their attention and by offering the possibility of regular feedback. Furthermore, by synchronizing teaching, learning and testing, they may lead to a better use of available time for study. This can positively influence school output in that it will affect the rate of progress in individual student's school careers.

Flexible units offer two more possibilities to the student: choice of educational content and an individual pace of study. Whether the first leads to more motivation and more efficient school careers remains an unanswered question. In general, the second is appreciated by students and it therefore improves their motivation. Furthermore, it stretches the more gifted students, while offering less able students a greater opportunity for reaching mastery. Both will pay off in terms of school output. We therefore conclude that flexibly paced modular instruction can lead to more progress, fewer drop outs and better student motivation.

Until now, it has proved difficult to realize 'vocational coherence' within vocational courses. There is also little evidence for its impact on student motivation and school output.

Research: modules and their effects

Two studies were conducted in short senior secondary vocational education (KMBO) and day-release schooling for young employees.

The first one was intended to reveal how modular instruction was put into practice in this field of education. Interviews, followed by case studies in three different branches, showed two major variants of modular design. The first variant is characterized by individual instruction, self-instructional material, a deliberate sequence of modules, differentiation in learning pace and exemptional testing. This is referred to as the flexible variant. The second variant shows a minimal use of modular learning: there is whole class instruction and the afore mentioned characteristics are missing. Subject matter is divided into self-contained units in which instruction and learning takes place, but the units do not always correspond to testing units and they are, if at all flexibly available, not used in that way. This is referred to as the inflexible variant.

The second study compares the effect of both variants on students' motivation and school output to non modular vocational education. 41 vocational courses from four different sectors in KMBO and day-release schooling were investigated, each of which represented one of three variants: the flexible modular, the non flexible modular and the non modular. It was hypothesized that:

1. a modular variant, and a flexible modular variant in particular, would contribute to students' motivation;
2. student motivation would affect course output;
3. modular instruction would affect course output and that this could largely be explained by motivational changes in students.

Course output was specified by two variables: student's progress and drop out rate. Students' motivation was specified as motivatedness and operationalized as their investment in school: how actively they were participating in learning activities. Covariables reflecting students' cognitive level and achievement motivation, appeal of content matter and the supporting character of the learning group, were also entered into the design.

The variables were measured by interviews, written questionnaires and existing tests. Students' motivation was measured three times during one school year. Data on which (modular) variant was present were collected on course level; all other data were collected on student level.

Multilevel analyses were executed to test the hypotheses.

Results show that modular instruction, in its identified variants, improves students' motivation regardless of their achievement motivation and their level of cognitive functioning. In KMBO education the impact on motivation was stronger in the flexible than in the non flexible variant.

Modular variants however do not affect course output, either directly or indirectly by improving student motivation, as was expected.

Conclusions

The fact that modular instruction enhances student motivation may be attributed to two possible factors: the use of self-contained units and vocational coherence. Modular and non-modular courses do differ regarding the first factor. Whether they differ concerning the second was not investigated. For the time being, we regard the results as confirming the effectivity of self-contained units in respect to students motivation, by keeping students' attention span, providing regular feedback, and synchronizing teaching, learning and testing. Flexibility, the third aspect, also contributes to motivation but this was the case in only one of the two types of education under study. This differential effect may be due to differences in the degree to which students in the two types of education are familiar with independent study.

Future research needs to assess the features that make self-contained units effective as well as to study the ways in which vocational coherence can be realized by modular learning and what this may contribute to students motivation and net learning results.

Why modular learning, despite of its impact on student motivation, does not contribute to school output, is another question that deserves further investigation. In order to find starting points to explain this, a model is proposed in which time on task is presented as an additional link between modular instruction and school output. The model reflects the assumption that modular instruction not only enhances motivation but the opportunity to learn, both of which in their turn may lead to more time on task and by way of that to higher school output. Future research could be designed to test this model and to assess whether the concept of time on task has any strategic value in improving vocational education's output.

Policymakers' expectations that students' motivation could be positively influenced by modular instruction were confirmed. The result of the studies supports vocational education policy to continue with modular courses. As to further recommendations, one should be cautious. Although modular courses

foster students' motivation, it is unclear which elements are exactly responsible for this. Furthermore, some of the features such as regular feedback may as well be incorporated into traditional courses and be of benefit there too.

Modular instruction does not increase course output, which is so badly desired. One conclusion must be that in handling the drop-out problem, for instance, more is needed than modular education alone. As far as student progress is concerned, flexible modular courses may even slow down the pace at which students get through their courses. This may not be harmful, as long as it stays within certain boundaries. It can even have positive effects, as far as it improves learning outcomes and the level of mastery achieved. This should be controlled however, whenever students are given the opportunity to pace their learning themselves.

Self paced learning is the most common way in which flexibility is practiced in short secondary senior vocational education and day-release schooling. This is possibly due to the fact that in vocational education it is still usual to offer fixed combinations of modules to cover whole courses, corresponding to well known, recognized certificates, in spite of all pressure that is said to be exerted nowadays on this field of education to be flexible. It might be interesting to see if current further developments in this field of education may lead to achieving other aspects of flexibility.

Modular learning can be useful in structuring vocational education making it flexible and in motivating students. This is not to say, however, that modules alone will automatically solve the problems facing vocational education, as they sometimes are supposed to do.