workshop **Preparing Staff for the Education of the Renaissance Engineer**
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HOW TO GET STAFF INVOLVED IN EDUCATIONAL CHANGE?
A Model of Professional Behavior might help.

Henk Vos
University of Twente, Dept. Electr. Eng., Enschede, The Netherlands/ Educational Consultant
e-mail: h.vos@el.utwente.nl

Joanna Daudt
Delft, University of Technology, The Netherlands
e-mail: J.P.R.B.Daudt@its.tudelft.nl

In a research-oriented university environment, faculty are very independent and educational organization is anarchical and non-hierarchic (cf. Birnbaum, 1988). Thus it is difficult to start innovations and bring them to a successful end. A systematic approach with the aid of a model might help. Models for innovation in education serve different goals. One is to model the actions and phases in renewal (see e.g. Havelock, 1973). Another one is to model the client. We focus on the last one because the idea behind this approach is that faculty responsible for the courses, are professionals in their field of knowledge. This expertise should be used, and their responsibilities should be considered.

The systematic of this approach can be described with a model of four aspects of professional behavior (Van Delden, 1992). On the dimension of internally vs. externally oriented action, we distinguish rational use of knowledge and idea's (intellectual behavior) and doing something, making a visible contribution (pragmatic behavior). On the dimension subjective inside states vs. objective outside states we distinguish personal satisfaction and experience from interaction with other people (individual social behavior) and provided rewards and fulfilled conditions by the use of material or symbolic means (instrumental behavior).

Influencing professionals thus is possible in four ways: rationally explaining and discussing issues, personally getting people involved, operationally trying to get results and providing means or some kind of rewards (incentives).

Often people try to influence faculty in one or two of these ways only, e.g. by analyzing problems and trying to convince them (rational aspect only) or by asking them to do something (personal aspect only). This is not sufficient. Also time is important: changes need time to implement the interventions in the pace the people can handle. Now we come to the topic of the workshop.

Preparing staff for the education of the Renaissance Engineer?

Preparing staff means preparing people for a change in education and in the instructional environment (including the students). The question we start with is the question:
who prepares staff? Possible answers are: they do this by themselves; their colleagues do this in the teams in which they are involved or by the way of curriculum committees; the scientific community does this by formal and informal talks on conferences and visits to institutes; educational consultants can give the staff ideas or train them; and finally the managers or leaders of the departments can play a role in preparing staff by providing schooling, hiring educational consultants, etc. Usually all of these actors and stakeholders are involved in preparing staff for a new way of teaching. They all can influence each other and themselves. But how to do this effectively?

What is needed is not only to develop staff but also to motivate staff to develop, in order both to influence and change themselves and others. Therefore a model of influencing staff
can help in order to analyse any educational change proposed, to design an approach for renewal, and to evaluate good/ bad practices. The model involves two dimensions, and thus leads to four ways in which professional behaviour can be influenced.

Four aspects of influencing professional behaviour

The behaviour of professionals will be viewed from two dimensions that give a grip for influencing them, for changing their behaviour. These two dimensions relate to activities and changes therein, and states and changes therein. The endpoints of these two dimensions are respectively: intellectual behaviour (rational influences) vs pragmatic behaviour (operational influences) and formal and instrumental behaviour (influences by conditions) vs personal and social behaviour (influences on feelings).
The four ways to influence professionals as related to the endpoints of the dimensions of influencing professionals can be illustrated as follows. For each of the four also a weak point is included.

1. Rational (intellectual behaviour)
generating ideas, thinking
developing vision, explaining
discussing, asking why
policy development, steering committee, workshop,
At this endpoints the practical approach and results often are neglected.

2. Operational (pragmatic behaviour)
getting results, doing
fast, small successes, let people score
make results visible soon
At this endpoint there often is no patience with people who want to understand why.

3. Conditional (formal, instrumental behaviour)
information (problems, needs, goals)
methodical approach along clear procedures (rules)
providing support (money, concepts, help, training)
charging people with a responsibility in a (in)formal position
rewards, incentives, status / enforcement
At this endpoint personal relations are sometimes neglected.

4. Personal (feelings, social behaviour)
getting people involved, motivated
creating teams
sounding motives & needs of individuals
inviting initiatives (from informal opinion-leaders)
At this endpoint sometimes the need for change is forgotten.

The two dimensions and four endpoints lead to four quadrants in which each professional or group of professionals can be placed with respect to their preferred (change in) behaviour. This will not be done here. What is more important in our view is to influence professionals along all four endpoints (or quadrants, if preferred). In good practices this will be the case.

An example of good practice

As an example of an analysis of a good practice the Delft case is presented (Joanna Daudt: Staff development and teaching teams):
The rational influence was to present a problem to the teachers namely that the students did not see the coherence between the courses in the core curriculum of the programme.
As a second action all teachers (personal influence) involved in the core curriculum, are asked and motivated to analyse this problem. A working group of volunteers was formed (conditional) to discuss and develop a new structure to improve and make visible that courses are linked together

(operational). This working group presented their results to all the teachers who are involved in the core curriculum.

Operational influence: it was proposed to cluster the 46 different courses into six clusters in the first year and five clusters in the second an third year. As a result of this clustering teaching teams are made to make coherent course with a variation of theory and practise (assignments) and using adequate teaching methods.

The personal influence came from the formation of teaching teams who also had to develop and design an integrated exam (operational).

Another conditional, formal influence was that for each cluster a co-ordinator was appointed who was the responsible to the director of studies. The coordinators received extra support of student assistants.

Discussion

According to the authors, motivating the scientific staff to participate in curriculum change can only be successful if all four mentioned aspects should be considered and influenced. In a research oriented university staff development still cannot be top down enforced because the visibility of research productivity is higher and as a consequence is the reward of research activities.

Conclusion

Interventions with professionals are effective if they contain all four elements together and provide time for change. Preparing staff for Education of the Renaissance Engineer is effective only if the interventions appeal to the staff's: intellect by providing them with a vision; entrepreneurship by involving them in activities; conditions by giving (in)formal rewards and stimulation to experience feelings and thus providing a motivation. Included in the conditions should be to provide time for change, for instance by presenting a clear pace for change.

Literature

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