Process evaluation of a school-based education program about organ donation and registration, and the intention for continuance

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Abstract

This paper describes the process evaluation of an organ donation education program for high school students aged 15–18 years of which the effectiveness was established. The program consisted of three components: a video with group discussion, an interactive computer-tailored program and a registration training session. A cross-sectional survey was conducted among 50 teachers who had recently worked with the program. The results show that all teachers reported to have implemented at least two of the three intervention components, while a majority of teachers reported to have implemented all components. Teachers’ attitudes toward the program were generally positive. They reported that the opinions of students and colleagues in their own department were most influential in their decision to provide the education program. Furthermore, teachers were very confident about their ability to apply the different parts of the education program. The educational quality of the program was evaluated as moderately positive and almost all teachers had the intention to use the program again in the future. Because of the positive evaluations and intentions for future implementation by teachers, and justified by its previously established effectiveness, the education program should be considered for large-scale dissemination among high schools in The Netherlands.

Introduction

The shortage of organ and tissue donors remains an important problem in The Netherlands as well as in other countries. In 2001, only 552 people in The Netherlands received a donor organ (cadaveric donations only), whereas 1458 people were waiting for a transplantation (Eurotransplant, 2001). The costs involved in organ transplantation are for a large group, particularly patients with kidney failure, much lower than the costs for continued dialysis, while the quality of life is much higher. Organ donation and transplantation is partly dependent on the legislation concerning organ donation and attitudes of people (Hoog, 2001; Akgün et al., 2002).

In order to increase the number of potential organ and tissue donors, the Dutch government introduced a new organ donation registration scheme in 1998. This new law is based on a 'decision system', which means that each citizen decides by virtue of his/her own will and integrity whether he or she wants to be registered as a potential organ and tissue donor. From 1998, every Dutch person who reaches the age of 18 years receives a registration form with four registration options: (1) registration as a posthumous organ and tissue donor, (2) registration as a donor but only for some specific organs and tissues, (3) registration as a non-donor, and (4) registration to leave the decision to the next of kin or a specific person. In order to create clarity for all those who...
involved in a possible transplantation, the decision is centrally registered in a Donor Register.

However, to date the majority of the Dutch population (63%) (Donorregister, 2002) has not react to the invitation of the Dutch government to register their organ donation preference. Furthermore, only one-third of adolescents have completed and returned a donor registration form (Donorregister, 2003). Three Social Cognitive Theory (SCT)-based (Bandura, 1986) studies (Brug et al., 2000; Reubsaet et al., 2001a,b) were conducted among Dutch adolescents to identify important predictors of organ donation registration. Based on the predictors of willingness to register an organ donation preference, a school-based education program about organ donation and registration for students aged 15–18 years was systematically developed to enable adolescents to make a well-considered decision about organ donation and to encourage them to centrally register their decisions with respect to organ donation.

The ‘Organ Donation and Registration’ program consisted of three intervention components, which were used in two 50-min lessons. Number of students in the class was between 25 and 30. In the first lesson, students watched a video in which positive and negative outcome expectations concerning organ donation and registration were discussed. The different outcome expectations in the video were aimed at eliciting a class discussion among adolescents. The second lesson consisted of working with an interactive computer program installed on a CD-ROM that provided tailored information about organ donation and registration. Lastly, students were invited to practice the completion of a donor registration form (registration training session). Teachers were provided with a manual in which the program was described and instructions were provided on how to deliver the lessons. In an earlier study among 2868 Dutch high school students aged 15–18 years, the efficacy of this school-based organ donation program was established (Reubsaet et al., 2004). Students who were exposed to the program were more likely to register their organ donation preference at the age of 18 years, were more willing to become an organ donor posthumously, experienced fewer negative outcome expectations concerning organ donation registration, were more aware of social outcome expectations, reported more knowledge about organ donation registration issues and experienced more self-efficacy beliefs with respect to organ donation registration. Students’ evaluation of the school-based education program was favorable.

Evaluation research most often focuses on the effects of an intervention, frequently without paying much attention to how the effects were achieved (Israel et al., 1995). Effectiveness alone is not enough to disseminate an education program. In The Netherlands, schools can choose their teaching materials without interference from the Dutch government (Eurydice, 2001). The intermediaries—the people who need to use and implement the program—should be convinced about the usefulness and applicability of the program. Therefore, in addition to effect studies, it is important to systematically analyze the process of intervention implementation. The main purpose of such a process evaluation would be to determine the extent, accuracy and quality of the implementation of a specific intervention (Windsor et al., 1994; Israel et al., 1995).

The present paper examines these issues among the most important intermediaries for the present program: teachers. The framework of the education program was guided by Bandura’s SCT (Bandura, 1986) and prior research on the intention to register organ donation preferences among adolescents. The present paper deals with the following research questions:

1. To what extent did the teachers implement the ‘Organ Donation and Registration’ program?
2. How did the teachers evaluate the ‘Organ Donation and Registration’ program (attitudinal, subjective and control beliefs, educational quality, and characteristics of innovations)?
3. How many teachers intend to use the ‘Organ Donation and Registration’ program in the future?

Theoretical framework

In order to accomplish structural adoption of the ‘Organ Donation and Registration’ program in the
Dutch educational curriculum, it is important to understand the process of diffusion. Therefore, Rogers’ Diffusion of Innovations Theory (Rogers, 1995) was used as the framework for the present study. Rogers defines an innovation as ‘an idea, practice or object that is perceived as new by an individual or other unit of adoption’ (Rogers, 1995). Rogers (Rogers, 1995) and Zaltman and Duncan (Zaltman and Duncan, 1977) identified characteristics that can expedite a possible adoption or continuation of an innovation. For the present study, the concepts relative advantage (observed or actual advantages of the innovation compared with the current situation), complexity (the degree to which the innovation is perceived as easy to understand and use), trialability (the extent to which the innovation can be tested), observability (visibility of the results of the innovation for others), compatibility (the extent to which the innovation fits with the target group), reversibility (the extent to which an innovation can be reversed or discontinued), risk (the degree of uncertainty caused by the introduction of the innovation) and modifiability (the extent to which the innovation can be updated or modified) of the program were studied.

In addition to the characteristics of an innovation, it is important to explore more thoroughly the process of innovation decision making. Because the Dutch education policy is based on the idea of educational freedom in which teachers choose their teaching materials without interference from the Dutch government (Eurydice, 2001), educational quality of the program may be significant for structural adoption in the school curriculum. Meta-analyses of health promotion interventions have identified that specific principles derived from learning theories were generally found to be predictive for program effectiveness (Mullen et al., 1985, 1992). In the present study, five of these ‘learning principles’ were used to assess the perceived educational quality of the ‘Organ Donation and Registration’ program:

1. Relevance (the degree to which the content of the education program is perceived to be tailored to the level of knowledge and beliefs of students)
2. Individualization (the perceived degree to which students can individually attend the education program)
3. Feedback (the degree to which students receive information about the extent of progress achievement)
4. Reinforcement (the teachers’ perception of the degree to which students receive rewarding information about the desired behavior)
5. Combination (the perceived degree to which the program provides multiple or alternative learning principles)

Lastly, the Theory of Planned Behavior (TPB) (Ajzen, 1991) was applied to structure the social and psychological dispositions towards providing organ donation education. Although this model has not often been applied within the context of curriculum innovation, there is good reason for its application because teaching may be regarded as an intentional act that is guided by teachers’ beliefs (Paulussen, 1994). According to the TPB, the intention to perform a certain action is the main determinant of actual behavior (registering organ donation preference), and is best predicted by attitudes, subjective norms and perceived behavioral control. Attitude refers to the perceived consequences of registration and is determined by the evaluation of the consequences of that behavior. Subjective norms are conceptualized as the weighted result of perceived opinions of important others about organ donation registration and the motivation to comply with these expectations. Perceived behavioral control refers to the perceived degree of difficulty to register a personal preference with respect to organ donation. A person who has a positive attitude, who experiences a positive subjective norm and has high perceived behavioral control with respect to registering an organ donation preference will be more likely to intend to register his/her preference.

### Method

**Respondents and procedure**

Thirty-nine high schools in The Netherlands were randomly selected to participate in the present study.
Based on a report from the Dutch Institute for Curriculum Development (Graft and Lensink, 2000), teachers who gave lessons in General Natural Science, Biology or Social Science were selected. All teachers (N = 77) who had worked with the ‘Organ Donation and Registration’ program were invited to complete a questionnaire measuring their opinions about the program. A total of 50 teachers (65%) responded. Because of anonymity, the reasons for non-response could not be studied. Respondents were teachers at three different high school graduation levels: preparatory secondary vocational education (4%), senior general secondary education (26%) and university preparatory education (32%). A total of 19 teachers (38%) taught in both senior general secondary education and university preparation level, and 32% were female. On average, teachers had been in teaching for 18.5 years and 56% had no previous experience with organ donation registration education.

Design and measurements
The design of the study was cross-sectional and the self-administered questionnaire was based on earlier evaluation studies of school-based education programs, adjusted for the specific topic of the present program. Completion of the questionnaire took about 30 min.

The questionnaire consisted of the following parts. Table I presents the means and SDs of the scales.

Sociodemographic variables
Respondents were asked for their sex, level of graduation education they taught at, years of experience as a teacher, experience with organ donation education and their religion.

Implementation of the ‘Organ Donation and Registration’ program
Six items were included to measure which parts of the education program actually were used during the lessons. In addition, respondents were asked how serious students had worked with the different components of the ‘Organ Donation and Registration’ program.

| Table I. Mean scores (SD) and number of items of the scales and items used |
|-----------------------------------|-----------------|---------------|
| Scale/item (possible range)       | No. of items    | Mean (SD)     |
| Attitude (−10/+10)                | 14              | 4.63 (2.25)   |
| Program-related subjective norm (−8/+8) | 10              | 0.23 (2.03)   |
| Donation education-related subjective norm (−10/+10) | 10              | 0.24 (2.55)   |
| Perceived behavioral control (−2/+2) | 6              | 1.12 (0.44)   |
| Educational quality (−2/+2)       | 7               | 0.54 (0.55)   |
| Compatibility (−2/+2)             | 1               | 0.82 (0.81)   |
| Complexity (−2/+2)                | 1               | 1.20 (0.54)   |
| Observability (−2/+2)             | 1               | −0.49 (1.16)  |
| Reversibility (−2/+2)             | 1               | 1.24 (0.66)   |
| Risk (−2/+2)                      | 1               | 0.76 (0.96)   |
| Relative advantage (−2/+2)        | 1               | 0.89 (0.64)   |
| Trialability (−2/+2)              | 1               | 1.14 (0.35)   |
| Modifiability (−2/+2)             | 1               | 1.00 (0.51)   |
| Intention to use the program (−2/+2) | 3              | 1.00 (0.77)   |

Evaluation of the ‘Organ Donation and Registration’ program
Respondents were able to evaluate the components of the education program with a grade ranging from 1 (very bad) to 10 (excellent).

Attitudes toward the ‘Organ Donation and Registration’ program
Attitudes toward the program were measured as a weighted result of feasibility (F) and the subjective importance (I) of the learning outcomes proposed by the program (ΣF, I) (Ajzen, 1991). Seven propositions were included to measure the feasibility of learning outcomes (‘Do you expect that by providing the “Organ Donation and Registration” program, students will be better prepared to make a well-considered decision about organ donation?’) (Cronbach’s α = 0.84) and seven propositions assessed the subjective importance of these beliefs (α = 0.88). Respondents could indicate on four-point and five-point scales their agreement with these propositions. High scores (+2) reflected positive beliefs, while low scores (−2) reflected negative beliefs.
Subjective norm

A total of five items was included to measure the normative beliefs with respect to the use of the ‘Organ Donation and Registration’ program ($\alpha = 0.80$) and respondents could answer the questions on five-point scales (e.g. ‘How will the students react when you use the “Organ Donation and Registration” program in the future?’). Five items measured the normative beliefs with respect to general education about organ donation and registration ($\alpha = 0.63$) and respondents could indicate on four-point scales their agreement with the propositions. A sample item was: ‘Do you think that the school board finds it important to educate about organ donation and registration?’ Respondents’ motivations to comply with the different referents (students, school board, colleagues in other/own departments and parents) were measured by five items ($\alpha = 0.67$) and agreement could be indicated on four-point scales (e.g. ‘How much do you comply with the opinions of colleagues in other departments with respect to organ donation and registration education?’). Two subjective norm scores (one with respect to the education program and one with respect to education about organ donation and registration in general) were calculated by multiplying each normative belief ($NB$) by the respondents’ corresponding motivation to comply ($MC$) and adding these different scores into a new subjective norm variable ($\sum NB \times MC$) (Ajzen, 1991).

Perceived behavioral control

Seven propositions reflected perceived behavioral control beliefs with respect to different aspects of the education program ($\alpha = 0.81$) and respondents could indicate their agreement on four-point Likert scales (e.g. ‘Do you think you are capable of having students discuss the pros and cons of organ donation and registration in small groups?’).

Educational quality

Seven items reflecting the so-called learning principles ‘relevance’, ‘individualization’, ‘feedback and reinforcement’ and ‘combination’ were included to measure the perceived educational quality of the ‘Organ Donation and Registration’ program ($\alpha = 0.69$). High scores (+2) reflected a positive evaluation of the educational quality of the program, whereas low scores (−2) reflected a negative evaluation.

Characteristics of innovation

Eight propositions were included to measure the concepts of innovation ‘relative advantage’, ‘complexity’, ‘trialability’, ‘observability’, ‘reversibility’, ‘risk’, ‘modifiability’ and ‘compatibility’. All propositions could be answered on four-point scales.

Intention to use the ‘Organ Donation and Registration’ program in the future

Three propositions measured the intention to use the program in the future and respondents were asked to indicate their agreement with these propositions ($\alpha = 0.89$).

Results

Implementation of the ‘Organ Donation and Registration’ program

In the first lesson, all teachers showed the video and used the different episodes (in which positive and negative outcome expectations were discussed) to elicit a discussion among the students in the class. Then, all teachers had their students in the class discuss their opinions and beliefs about the subject addressed in each episode. With respect to the first part of the second lesson, all classes were made to work with the interactive computer program in a one-off session and 83% of the teachers indicated that students had worked seriously with the computer-tailored program. Last, almost one-third of the teachers did not implement the registration training session in the second lesson due to lack of time.

Evaluation of the ‘Organ Donation and Registration’ program

Teachers evaluated the video and subsequent group discussion with a mean grade of 7.1 (SD = 0.77; range 1 = very bad to 10 = excellent), the interactive computer program was graded with a 6.7 (SD = 1.23)
and the registration training session was evaluated with a mean grade of 6.2 (SD = 1.74). Overall, the ‘Organ Donation and Registration’ program was evaluated with a mean grade of 6.9 (SD = 1.03).

**Attitude**

Teachers’ attitudes toward the learning objectives for the ‘Organ Donation and Registration’ program were generally positive (Table II). They were most positive about ‘gaining insight into problems concerning organ donation and registration’, ‘taking a motivated opinion about organ donation and registration’ and ‘being prepared to make a decision about organ donation and registration’. Teachers were least positive about the activity of completing a donor registration form.

**Subjective norms**

Teachers perceived moderate social pressure from colleagues, students and students’ parents with respect to implementing the ‘Organ Donation and Registration’ program, and with respect to education about organ donation and registration in general (Table III). Colleagues from other departments were perceived as less influential on the decision to provide organ donation registration education in general as well as on the decision to provide the education program. Students and colleagues from their own department were regarded as most influential on both decisions.

**Perceived behavioral control**

Teachers were very positive about their ability to apply the different parts of the education program (Table IV). Teachers were most confident about their ability to control disruptive behavior during class discussion and to create an open atmosphere for discussing organ donation registration in class. However, they felt more insecure about their ability to apply small group discussions about the pros and
cons of organ donation registration, and to cope with students with personal questions or problems related to organ donation issues.

**Educational quality**

Teachers evaluated the educational quality of the ‘Organ Donation and Registration’ program moderately positive (Table V). According to the teachers, the video and group discussion appealed to most students. Further, they perceived the program to be well tailored to the level of knowledge of students. Teachers were less positive about the extent to which students received information about their achievement in learning about organ donation and registration, and the practicability of the registration training session.

**Innovation characteristics of the program**

Table I shows the teachers’ evaluations of the innovation characteristics of the program. The extent to which the program could be discontinued (reversibility) if needed was evaluated as the most important characteristic, followed by the degree to which they perceived the program as easy to use (complexity). Furthermore, they thought that the program could easily be tested in other schools. Teachers were least positive about the degree of observability of the program by others (e.g. parents, other schools).

**Intention to use the ‘Organ Donation and Registration’ program in the future**

A mean intention score of 1.00 (SD = 0.77; range $-2/+2$) was found, with only 16% of the respondents reporting a negative intention for future use. Of all respondents, 94% had the intention to plan classroom education about organ donation and registration next school year, 96% thought that it was important to provide education about organ donation and registration in the future, and 80% intended to adopt the ‘Organ Donation and Registration’ program in the curriculum.

**Discussion**

The present study was conducted to assess whether an effective ‘Organ Donation and Registration’ program was implemented as originally planned by the most important intermediaries for the program (i.e. teachers), how they evaluated the program and to assess their willingness to use the program in the future.

The present study showed that all teachers implemented at least two of the three components of the education program, while two-thirds implemented all three components. Lack of time seemed to be the most important reason for not using the registration training session. Consequently, the training session was evaluated least positive in comparison with the other components. Since the training registration session was found to be very efficacious in an earlier study (Reubsaet et al., 2003), teachers should be convinced of the usefulness and importance of the training. Moreover, students reported that they enjoyed practicing with the registration form (Reubsaet et al., 2003). In total, the ‘Organ Donation and Registration’ program was evaluated at 6.9 (on a scale from 1 = very bad to 10 = excellent).
Teachers’ attitudes toward the learning objectives for the program were positive. They were most favorable towards the objective of gaining insight in the subject of the program, taking a motivated opinion, and making an informed decision about organ donation. Teachers were least positive about the expected effects of the program on completing a donor registration form at the age of 18 years. Teachers’ reservation toward this learning outcome was mainly due to their low perceived feasibility expectations. This perceived feasibility might be a consequence of the fact that completing a donor registration form concerns behavior that should occur after several years (long-term effects).

The Dutch education policy is based on the idea of educational freedom, which means that schools can choose their teaching materials without interference of the Dutch government. In general, teachers take the decisions (Eurydice, 2001). In the present study, opinions of colleagues in their own department and of students were found to have the most influence on teachers’ decision to provide organ donation and registration education in general, as well as on providing the present ‘Organ Donation and Registration’ program. In their decision to adopt the program, teachers were influenced by their colleagues’ approval and by their expectations of the program. In a study on possible correlates of adoption of classroom-based AIDS education in The Netherlands (Paulussen et al., 1994), it was also found that colleagues within the same department and students were perceived as important in the decision to adopt specific classroom-based education.

Half of the teachers who participated had never provided education on organ donation and registration before. However, teachers were very confident in applying the different components of the program. In contrast to Paulussen et al. (Paulussen et al., 1994), the present study found that teachers were most positive about their management skills to control disruptive behavior during organ donation classroom activities. It appeared that teachers were more insecure about situations in which they had to cope with students expressing personal problems with respect to organ donation (Paulussen et al., 1994), and in which they had to organize small group discussions on the pros and cons of organ donation and registration. The inexperience with the topic of organ donation registration among half of the teachers may account for this uncertainty. In the future, more specific instructions and manuals for organizing small group discussions and more specific information on the pros and cons of organ donation registration may be included in the program.

Teachers’ evaluation of the educational quality of the ‘Organ Donation and Registration’ program was moderately positive. They were least positive about the registration training component and the

### Table V. Mean scores (SD) of the principle of educational quality

<table>
<thead>
<tr>
<th>Concept</th>
<th>Item</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance</td>
<td>The program is tailored to the students’ level of knowledge</td>
<td>0.92 (0.64)</td>
</tr>
<tr>
<td></td>
<td>The program is tailored to the students’ developmental stage</td>
<td>0.80 (0.78)</td>
</tr>
<tr>
<td>Individualization</td>
<td>The video appeals to students and is helpful in clarifying their experiences, questions and beliefs</td>
<td>0.94 (0.75)</td>
</tr>
<tr>
<td></td>
<td>The CD-ROM appeals to students and is helpful in clarifying their experiences, questions and beliefs</td>
<td>0.33 (1.16)</td>
</tr>
<tr>
<td></td>
<td>The registration training session appeals to students and is helpful in clarifying their experiences, questions and beliefs</td>
<td>0.02 (1.16)</td>
</tr>
<tr>
<td>Feedback</td>
<td>The program provides sufficient feedback about the extent of progress achievement</td>
<td>0.22 (1.05)</td>
</tr>
<tr>
<td>Combination</td>
<td>The program provides sufficient alternative learning principles</td>
<td>0.52 (0.93)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0.54 (0.55)</td>
</tr>
</tbody>
</table>
extent to which this training exercise was helpful in clarifying students’ personal experiences, questions and beliefs about organ donation and registration. In addition to lack of time, this may explain the fact that one-third of the teachers did not apply the registration training session. As for content and layout, teachers believed that the program matched the students’ level of knowledge and developmental stage well. Therefore, it seems reasonable to conclude that the program can be applied in all three different high school graduation levels (i.e., medium, higher and university preparation level).

With respect to characteristics of an innovation that are expected to regulate adoption (Rogers, 1995), teachers regarded the degree of reversibility of the program and its low level of complexity as very important. Teachers were less positive about the visibility of the organ donation education activities for others. Organ donation seems to be considered as a socially relevant issue and teachers may find it important that parents or colleagues, for example, can see that they teach students about organ donation and registration. Publicity of the ‘Organ Donation and Registration’ program in media, such as school papers or local journals, may therefore be an effective strategy.

Almost all respondents indicated that they intend to use the program in the future and the majority was willing to adopt the ‘Organ Donation and Registration’ program in the curriculum. However, this positive adoption intention of teachers is no guarantee for actual adoption or continuation (Rohrbach et al., 1993; Levenson Gingiss et al., 1994). Further research should be directed at the relation between the intention to adopt the program and its actual adoption later.

Because of the positive evaluation and intentions among high school teachers and the established effectiveness (Reubsaet et al., 2004), the school-based education program seems ready for large-scale dissemination. The Dutch Foundation of Donor Education is now implementing the education program at 350 (out of 735) high schools in The Netherlands and efforts are taken to include the program as a regular topic within the school curriculum.

**Acknowledgements**

The authors thank Emilie Schaeken for his cooperation in the recruitment of schools. The present study and previous program development research was initiated by the Kidney Patient Foundation Maastricht, and was funded by the Dutch Kidney Foundation, The Dutch Ministry of Health, CZ Health Insurances and the Dutch Foundation for Donor Education (NIGZ/Donorvoorlichting).

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Received on November 11, 2003; accepted on February 17, 2004