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How do teachers in vocational and higher education nudge their students? A qualitative study

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ABSTRACT

Nudging is a strategy from behavioural economics that subtly influences behaviour by changing the environment. Despite its recent introduction in education, no overview exists of what behavioural interventions are already practiced in education, and how these fit within nudging frameworks. In this qualitative study, we investigated what nudges are used in vocational and higher education by interviewing 33 teachers and 15 students, and conducting 11 classroom observations. We provide an overview of currently used nudges to promote learning behaviour, and distinguish between intuitive, didactic, and planned nudges. Results also show that teachers use nudging intuitively and based on didactic techniques, but are generally unaware of doing so. This provides opportunity for introducing explicit knowledge of nudging to augment teachers' toolboxes for designing learning environments. Future research can test nudges teachers already use in practice, and further integrate the behavioural and educational perspectives on nudging interventions in an educational context.

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Nudging; classroom interventions; learning behaviour; tertiary education; qualitative research

In education, a key goal is to equip students with the skills and competencies that enable them to demonstrate behaviours essential for becoming independent and productive members of society and the workforce. A focus of teachers is therefore to change behaviour of students in and outside the classroom in such a way that enhances and supports their learning. For example, a teacher may focus in class on how to create an efficient planning, hoping their students convert this knowledge into planning behaviour. However, other approaches to facilitate behaviour exist outside of the educational paradigm. In this article, we focus on a new perspective from behavioural economics, namely *nudging*, as a tool to facilitate behaviour, and investigate its use within education in a

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qualitative way. Connecting these approaches to current practice in educational context can be beneficial for both fields. We will first discuss nudging, and then how it may tie in with current educational practices.

Nudging is a psychological intervention technique consisting of creating subtle changes in the environment that alter people's behaviour to guide them towards more desirable behaviour. Thaler and Sunstein (2008, 6) define a nudge as.

any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.

Thaler and Sunstein (2008) explain the effect of nudging using dual-process theory, which states that human behaviour is driven by two ways of processing information: System 1 and System 2. System 1, the automatic system, consists of uncontrolled, fast, associative thinking. System 2, the reflective system, represents careful, effortful deliberation. System 1 steers decision making with cognitive biases and heuristics, while System 2 makes choices on rational and conscious decision making. Because System 1 is faster and requires less effort, it often determines our behaviour, instead of the careful deliberation by System 2. This can lead to behaviour inconsistent with a person's long-term goals, as System 1 makes decisions that go against the long-term goals set by System 2, such as impulse buying while saving for a car. Nudging helps people with their decision making by recognising the heuristics and cognitive biases of System 1 and using these heuristics and cognitive biases to 'nudge' people towards their own long-term goals. It should also be noted that nudges do not coerce, but leave the autonomy to display undesirable behaviour intact. A well-known example of nudging is automatically opting-in instead of opting-out of an employer's pension plan: by having to opt out of a pension programme to quit, instead of having to opt in to join, many people chose to remain in the programme (Thaler and Benartzi 2004). Even though nothing changed for the rational deliberation of System 2, System 1 was convinced by presenting the desirable choice as the easy choice.

Nudging in education

While a large part of current nudging practices focuses on health-related behaviours (Halpern 2015; Szaszi et al. 2018), other areas, such as education, can also make use of this behavioural technique. For example, McEvoy (2016) found that presenting students with a loss frame ('you lose points per wrong answer') increased their final grades for multiple choice exams, compared to a gain frame ('you gain points per correct answer'). This effect was explained by students taking more risk in answering, helping insecure students to show their ability. Clark et al. (2020) asked students to set a task-based goal on how many practice exams they wanted to do to prepare for the final exam. This successfully increased the number of attempted practice exams and the final grades of the students. This effect was explained by students making a commitment to themselves, and their behaviour reflecting that commitment. These examples illustrate how changing the choice environment can help changing students' behaviour for the better in an educational context.

Although the behavioural perspective on nudging has only recently been introduced in the field of education, changing students' behaviour has been an interest of the

educational field for a longer time. Examples of this include theories on motivation (Ryan and Deci 2020; Heckhausen and Heckhausen 2008) and how self-regulation leads to autonomous learning behaviours (De Bruijn-Smolters 2017; Zimmerman 2002). Despite both the educational and behavioural perspectives dealing with behaviour, no integration of the two fields has taken place. For example, the first review of applying nudging in education by Damgaard and Nielsen (2018) only considers interventions from the behavioural perspective (i.e. interventions classified as a nudge), but does not really refer to interventions from the *educational* field that can easily be interpreted as nudges – but are just not identified as such. Similarly, a review by Lim and Lee (2022) studied the effectiveness of nudges in education, but views these through the lens of the field of behavioural economics by using search terms stemming from behavioural change literature and classifying these nudges through Münscher et al.'s (2016) taxonomy of behavioural change techniques. This while both fields are similar in their perspectives on behavioural change. For example, parallels can be drawn between nudges and educational concepts like scaffolding and affordances, as they are both similar ways to convert volitional motivation into behaviours (Heckhausen and Gollwitzer 1987). In supporting desired student behaviour, they are like stepping stones, laying between heavy-handed external regulation and providing no support at all. Furthermore, the perspectives of demonstrating behaviour through either an educational perspective or a behavioural perspective are also not mutually exclusive. For example, the aforementioned task-based goal setting of Clark et al. (2020) can be interpreted as an educational intervention, namely creating a learning goal for the self-regulation process (Zimmerman 2002), so that relevant self-regulatory behaviours are elicited from the student. Alternatively, from the behavioural perspective, it can be interpreted as a nudge using the cognitive process of commitment to promote the given behaviour (Cialdini 1993). The intervention can be interpreted and fit into their relevant paradigms from both perspectives, where they can be connected to other findings in the field. In this example, the educational paradigm may focus on how the intervention can be related to self-regulation and autonomous learning behaviour (Pintrich 2004; Zimmerman 2002). The behavioural paradigm may focus on how the intervention may be implemented successfully as a policy within the school to promote the relevant behaviour (Dewies 2022; Lokhorst et al. 2013; Weijers et al. 2022), on the effects of intervention transparency (Wachner, Adriaanse, and De Ridder 2021), and on the expected longevity of the intervention (Marchiori, Adriaanse, and De Ridder 2017). Consequently, educational researchers can gain valuable insights from a behavioural perspective, and similarly, those in the behavioural field can benefit from educational research findings.

While no theoretical integration has taken place, in practice, teachers can use techniques from both sides integrated into their lessons and education plans, and the same sort of intervention (e.g. the earlier mentioned goal-setting intervention) can be both interpreted as a didactic intervention and as a nudge. Both the educational and behavioural perspective therefore stands to gain from investigating current usage of behavioural interventions in education.

It should be noted that the introduction of nudging in education may be controversial to some who associate it with marketing and manipulation. Despite these associations, we argue that nudging can be a positive addition to the educators' repertoire of pedagogical and didactical tools. Nudges themselves have no direction and are neutral (Thaler and

Sunstein 2008) and their merit is determined by the people in charge of creating the choice architecture – so called ‘choice architects’ – in this case, teachers and other educational staff. As such, teachers can use a nudge to change student’s behaviour to the student’s own benefit. Indeed, the very first example given by Thaler and Sunstein (2008) in their seminal work is a nudge in education: a director of food services for a large city school system wonders how she should arrange the available food options in school cafeterias.

1 While behavioural interventions are relevant in every level of education, in this research we focus on vocational education and training [VET] and higher education. This is because education is aimed at increasingly allowing the student to become more autonomous. For teachers, this means that their role shifts from providing students with instruction and cues on how, what and when to study, towards supporting students in shaping their own learning process and become autonomous, self-regulated learners (American Psychological Association n.d.). Ideally, teachers should gradually withdraw their (external) support to give students more autonomy (Collins, Brown, and Newman 1988; see also the concept of scaffolding; Lock, Eaton, and Kessy 2017). As such, in vocational and higher education, there should be a greater shift away from external regulation, more so than in primary or secondary education, towards employing subtler techniques such as nudging.

Summarising, while there is yet a scarcity of research about nudging in education to achieve desired student behaviours, this does not mean that teachers do not already use nudges in their educational practice. Teachers may already use techniques based on educational and didactic paradigms that can also be classified as nudges. It is therefore worthwhile to first investigate what is already happening in the classroom, and evaluate this through the lens of behavioural economics. The research question of this study is therefore as follows:

What nudges do teachers in vocational and higher education already use to support students’ learning behavior?

Insight in the nudges that teachers already use provides new angles for nudge interventions to be tested in practice, allows teachers to connect their teaching practice with scientific results, allows the fields of education and behavioural economics to benefit from each other’s findings, and allows researchers to methodically investigate whether nudges that teachers are already using, are actually successful.

Current study

To identify how teachers already nudge their students, we set up a qualitative study. In this study, teachers and students in vocational and higher education were interviewed and observed in their classroom to provide an answer to the research question.

Method

Participants

This study is part of a larger research project and participating teachers were asked to join the entire project. This project is a collaboration of three education institutes: two VET-

schools, and one university of applied sciences. From each of the schools and the university of applied sciences, ten teachers were recruited. Two teachers dropped out after interviewing but stated their permission to include their interviews. Replacement teachers were found and interviewed. In total, 32 teachers were interviewed, of which 21 in VET and 11 in higher education. Teacher age ranged from 25 to 61 years ($M = 43.36$, $SD = 9.67$) and 69% was female.

Student-participants were recruited during classroom observations. Classes usually consisted of 10–25 students. The student interviews were scheduled coinciding with classroom observations (see below for details). One or two students could be interviewed per classroom observation. A total of 15 students were interviewed, of which 9 VET-students and 6 students from the university of applied sciences. Participants' age ranged between 16 and 48 ($M = 23.60$, $SD = 9.36$), and 60% was female.

Context

To clarify the research context, we pinpoint key distinctions for teachers and students in VET and higher education in the Netherlands, highlighting the following differences between the educational levels. VET-students have a larger diversity in their prior education than students in higher education, and their general age range is lower (16–20 years old compared to 18–22 years old in higher education). Furthermore, VET-studies are generally more focused on practical, vocation-oriented learning and less on abstract, conceptual knowledge and understanding compared to higher education. Teachers in both educational levels require vocational and didactic training prior to being able to teach. Teachers in VET have lower requirements in terms of vocation-related education than teachers in higher education, as their education should be as far as the respective level they teach at. As for their teaching-related education, VET-teachers require a didactic education of two years, where higher education teachers only require an on-job course of six months.

Design

The qualitative setup consisted of semi-structured in-depth interviews and classroom observations. To answer the research question, we identified nudges that teachers currently use. We explored this both through interviews with teachers and students, as well as through classroom observations. These measures were combined to also find interventions that teachers mentioned and actively applied but were not observed, and interventions that teachers did use but were not mentioned or used subconsciously.

Procedure

Semi-structured interview

Semi-structured interviews were chosen for their flexibility (Legard, Keegan, and Ward 2003). Participants were invited and then interviewed individually in a quiet, private location at their school, creating an accessible, familiar environment in which they could speak freely. The interviews were recorded and transcribed. Informed consent was obtained beforehand.

Interviews started with introducing questions, after which the researcher asked about the specified research question, ensuring to ask follow-up questions when relevant. At the end of the interview, participants were given the opportunity to ask questions or share any information they thought was relevant. They were thanked for their participation and informed about the follow-up on the project. This part was also recorded, as during debriefing, participants sometimes gave additional relevant information.

Teachers were asked what behaviours they wanted to see more of from their students in the context of their education, and what interventions they currently used to do so. The average interviews took 40 min ($SD = 12$ min), but some were done within 20 min and others took nearly an hour. A similar interview was held with students. Students were asked how their teacher supported desired behaviours. The average length of the interview was approximately 15 min, ($SD = 7$ min) ranging between 7 min and half an hour. The outline of these interviews can be found in Appendices A & B. As this research was part of a larger project, the interviews also contained questions about other themes, which were not used for the analysis in this paper.

Classroom observation

To get insight into nudges that teachers use, but were not mentioned during the interviews, classroom observations were held. The first author joined a teacher's regular class and noted all instances of the teacher attempting to facilitate behavioural change in their students regarding any aspect of their education. From each participating institute, a proportional number of teachers were asked to participate in an observation. These teachers were asked based on their availability and their representativeness for the group of teachers (e.g. not two teachers teaching the same subject) as a whole. The observation took place at a separate time from the interviews, in order to have the interview influence the way the teacher taught their class. In total, 11 classes were observed, of which 7 in VET and 4 in higher education. A class took an hour and a half on average ($SD = 31$ min) but could take from 45 min up to 3 h.

To decide what behavioural change attempts were nudges, the definition of Hansen (2016) was used, as it provides a more practical definition than the one by Thaler and Sunstein (2008). Hansen's (2016) definition leads to eight clear criteria that must be adhered to for an intervention to be called a nudge. These criteria can be found in Appendix C. The observation scheme based on these criteria can be found in Appendix D.

Analysis

The research themes were investigated using the Grounded Theory approach as a guideline (Strauss and Corbin 1997), following its three steps of open, axial, and selective coding. A visual overview of this process can be found in Figure 1. All interpretation

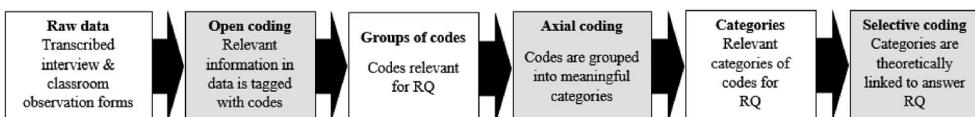


Figure 1. A visual overview of the analysis process.

and analyses were performed in Atlas.ti version 8 and were done by the first author. Data can be found on the Open Science Framework (https://osf.io/7fu94/?view_only=cb542a9a775a462fb5fc13e8641ac296).

First, open coding was used to identify relevant information and form it into emerging codes. The research question was used as a guideline to find what information was relevant. Interventions that fit Hansen's criteria (2016) of what counts as a nudge were identified and coded. A piece of information could be assigned multiple codes. The method of constant comparison was used, meaning that similar information was given the same code, and throughout this iterative process, codes were changed, added, or removed based on new information. An example would be the quote 'Ten minutes is nothing in game time.' being coded as 'priming'.

Codes were grouped into emerging categories (axial coding) after open coding was completed. Constant comparison was used during this process, with adding, removing, merging, and splitting categories as more codes were processed. This iterative process resulted in categories per theme that could provide information about the research question. In this example, 'priming' was later coded as 'presentation of information'.

Lastly, selective coding was used, linking the emerging categories together. An example would be the emerging category 'presentation of information' being linked to several other emerging categories (e.g. 'goal-related nudge') under the same name: 'didactic nudges'. These categories were then used to answer the research question.

Results

Citations provide examples that are illustrative for a phenomenon, rather than representative for all participants. As all interviews were done in Dutch, citations are translated.

Eleven nudge categories could be distinguished that address what nudges teachers already use to support students' behaviour. Some categories were used more frequently than others, as seen in Table 1. During selective coding, these categories were placed in three groups, named *intuitive nudging*, *didactic nudging* and *planned nudging*. Each category is defined below, after which the most prominent nudges in this category are discussed.

Interviews and classroom observations were done in two VET schools and one university of applied sciences. During analysis, no remarkable differences between the schools or educational levels were found in terms of different nudge categories teachers and students indicated to be used in practice. However, there was considerable variation among individual teachers both in the extent of their nudge usage and in the specific types of nudges they implemented.

Intuitive nudging

The nudge types social-related nudge, attention-based nudge and the messenger effect are based on an instinctive understanding of human behaviour. Tools for influencing human behaviour like peer pressure, directing attention and presenting authority come intuitively for most humans, corresponding with the statement by Thaler and Sunstein (2008) that nudging has been around forever.

Table 1. Frequency of mentioned by teachers and observed nudge categories.

Nudge type	Interviews		Observation	
	Number of interviews that mentioned this nudge (out of 32 interviews)	Proportion total mentions of nudges (out of 109 mentions)	Number of classes during which this nudge was observed (out of 11 observations)	Proportion of total observations of nudges (out of 79 observed nudges)
Intuitive nudging				
Social-related nudge	14 (43.8%)	12.8%	11 (100%)	13.9%
Attention-related nudge	7 (21.8%)	6.4%	4 (36.4%)	5.1%
Messenger effect	4 (12.5%)	3.7%	11 (100%)	13.9%
Didactic nudging				
Feedback and monitoring	18 (56.3%)	16.5%	10 (90.9%)	12.7%
Goal-related nudge	17 (53.1%)	15.6%	6 (54.5%)	7.6%
Presentation of information	17 (53.1%)	15.6%	9 (81.8%)	11.4%
Reminder/cue/prompt	17 (53.1%)	15.6%	9 (81.8%)	11.4%
Planned nudging				
Commitment technique	5 (15.6%)	4.6%	2 (18.1%)	2.5%
Identity nudge	5 (15.6%)	4.6%	6 (54.5%)	7.6%
Changes in the physical environment	4 (12.5%)	3.7%	9 (81.8%)	11.4%
Default	1 (3.1%)	0.9%	2 (18.1%)	2.5%

Social-related nudge. In this category fall all nudges with a social component. This can be the presentation of a social norm, facilitating social comparison, or giving a social reward like praise. People often look to what others are doing to determine what they will do. Interestingly, teachers were sometimes seemingly unaware of the power of these social norms. Teachers repeatedly set counterproductive norms for their students. For example, they told their class how students last year often started too late with the exam paper, or that nobody was answering their questions, while this presents a social norm to not perform the desired behaviour.

There are a lot of people who do not read the exercise in advance. (VET-teacher, 51, male)

A similar nudge is facilitating social comparison. The idea is that students who are behind make more of an effort to catch up with their classmates. Some teachers publicly track who has finished their work already, others show the work of well-performing students.

The moment you see someone that is really making the most of it, I show it to the others. 'Guys, look what's happening here!' Then they look at their own work and think: 'I can also show something I can do really well'. And then they lift each other up. (VET-teacher, 39 years old, female)

You let the people who practiced and prepared [a medical procedure practice task] perform it, and I tell the others: watch them and ask your questions. (VET-teacher, 45, female)

More seldomly, the social comparison was made to the teacher.

The next time you have to bring your book or you can't enter the class. If I can do it, so can you. (VET-teacher, 51, male)

Social rewards were often used as a promotion for desired behaviour. This usually consists of public praise, either about the student or their work. These social rewards were often reserved for individual situations.

I really like you as a student in class, I wish all students were like you. (VET-teacher, 45, female)

It does not matter how crap it is, I always try to find something [positive]. Even if it is just a nice cover. (Teacher in higher education, 53, female)

Attention-related nudge. This category makes use of human attentional biases to facilitate desired behaviour. Examples in practice are attentional directing like pointing at something or someone, raising their voice, or using a dramatic pause instead. Responding to these nudges is usually automatic. A more conscious version of this nudge type is explicating a certain aspect or consequence of behaviour. Note that the nudge consists of explicating these consequences to the student, not the consequences themselves.

Put away your phone. First you get some warnings (...) if that does not work, they have to put it in the phone bag [in front of the class] so they cannot listen to music. They know that is the consequence. (VET-teacher, 55, female)

Listen, if you do not pass this course, this is where it ends. You'll do your internship and after that internship you'll have to come back and do this course again. (VET-teacher, 51, male)

Lastly, teachers can make use of heuristics regarding attentional biases. Teachers indicated that they use the start or end of a lesson to send a positive message, in the hope that this influences the classroom behaviours of their students for the better. This corresponds with the primacy and recency effects in attention and memory.

And the way you end with a student or parent is always that you end with a positive feeling, even if you mentioned so much shit that is not going well, you end with a positive agreement. (VET-teacher, 43, female)

Messenger effect. Nudges in the messenger effect category are about the enhancement of persuasive messages by the role of the messenger. A message can, for example, be delivered by a source with which the target audience strongly identifies or looks up towards, and therefore have a larger behavioural change effect. This nudge was rarely explicitly mentioned in interviews with teachers. However, this nudge was perhaps most prevalent of all nudges during observations, as all communication by a teacher is enhanced by their role as a teacher.

It also depends on the teacher, on his charisma. When he's stern, you'll think: 'I have to pay attention now'. But say that a teacher walks in in a track suit, would you take him seriously? (Student in higher education, 20, male)

Some teachers explicitly reflected on their role and how that could affect their students, and even worked on that:

Sometimes I just don't teach. I have a class, but in the back of my mind I plan to use this time to form a bond with the pupils, students. (VET-teacher, 40, female)

Didactic nudging

The second category of nudge types (feedback and monitoring, goal-related nudge, reminder/cue/prompt, and presentation of information) corresponds with didactic techniques that teachers already practice. Didactic techniques that teachers use to teach knowledge and skills to their students can also be repurposed to nudge behaviour: applying a didactic technique to change behaviour often results in a nudge. For example, giving feedback is central for successful learning (Gagné 1985; Voerman et al. 2014), but teachers also use it to change behaviour, creating a feedback nudge.

Feedback and monitoring. Nudges in this category change behaviour by monitoring it and giving feedback to existing behaviour. This technique was used by almost every teacher. Monitoring, and the accompanying feeling of being observed, can function as a nudge, even if no feedback is given – but monitoring was often accompanied with feedback. Most commonly, this feedback came in the form of a compliment. Importantly, to be considered a nudge, the feedback should contain no new information.

[Teacher] walks around the classroom, just watching ... That gives the idea that you're not just here to goof off (...) All that gives an extra push. (VET-student, 21, male)

Giving compliments is important to them. (VET-teacher, 39, female)

A special case of feedback is the 'But you are free' nudge (Gueguen and Pascual 2000) in which the freedom to make one's own choices is emphasised to reduce resistance towards the intended behaviour.

I tell them literally (...): you have not been doing anything for 15 minutes. I'm fine with that, you're doing it for yourself, not for me. Not for your grandpa or grandma, for yourself. And then they look at you like: yes, you have a point. And they start working. (VET-teacher, 43, male)

Goal-related nudge. This nudge type is concerned with changing behaviour by relating it to some goal. The simplest way to do this is to explicitly relate the desired behaviour to the goal, or to the consequences of attaining that goal:

The goal of doing this exercise is to make you better at summarizing. (Teacher in higher education, 38, male)

A different approach is emphasising the consequences of attaining a goal. By doing this, the time-incongruity of 'task now – reward later' is reduced, as the consequence seems closer. In general, this was done in a positive manner, but was also used to emphasise negative outcomes or punishments.

I also emphasize the importance of practicing, because else we cannot continue. They can still decide not to do it, but I will emphasize the consequences. (...) We can't continue, we can't practice, you rob yourself of the opportunity to practice this because we only do this once. (Teacher in higher education, 56, female)

This was also done in the context of the later professional life of the student, emphasising the usefulness of the skills learned now to reduce the time-incongruity. When applied in this manner, it overlaps with the identity nudge described later by invoking a later identity. For example, one teacher would start every class by reading a short story from a medical professional, and discuss it with their students.

Sometimes I make a connection between the assignment and professional practice: (...) I connect public speaking, for example, with a situation in professional practice, it's not something you check off for [the course]. (...) you connect the assignment to the job and what they enjoy, and then you see that they go for it. (VET-teacher, 61, female)

An alternate version of this nudge, known as the head start, is where a teacher would make a goal seem closer by placing the first steps towards the goal in the past. This nudge was only used by a handful of teachers. Other times, the student was prompted to set their own goal, overlapping with the 'commitment technique' nudge type. Usually, this was done in one-on-one communication with the student.

'Where would you like to do your internship?' (...) 'And how are you going to get there?' (VET-teacher, 43, female)

I ask [the student]: (...) How far along are you: what have you already done? What do you need to do? Then do it now, or when are you going to do it? (VET-teacher, 61, female)

Lastly, the implementation intention (Gollwitzer 1999), was used by five teachers. This technique consists of setting a goal, then finding a desired behaviour relevant to that goal, and identifying a specific cue to perform that behaviour. Especially in one-on-one conversations these implementation intentions can be tailored to the specific student. A general example in education is the following:

If you have any questions, ask them immediately. (VET-teacher, 36, female)

Reminder/cue/prompt. These nudges consist of the facilitation of cues towards desired behaviour, often in the form of a reminder for the expected behaviour. This

was observed in different forms: the current exercise being written on a blackboard, a verbal reminder to a student, posters in the classroom as reminders for the no-phone rule, or emails to students to remind them of upcoming exams.

Put away your bag, take your bag from the table, take off your coat, put away your phone, it's just naming what you want to see. (VET-teacher, 37, female)

I like working with to-do lists. That is something students like. I put up on the board what has to be done. Works well, I feel. (VET-teacher, 44, female)

Pay attention, in this period you have to do these exams. If you did not get an invite, let me know. (VET-teacher, 38, female)

Presentation of information. All techniques used to change behaviour by changing the way information is presented belong in this category. The most used nudge in this category is the application and creation of an explicit structure to the available information, like presenting a large exercise in smaller steps, or simplifying and reformulating choice options for a student struggling to choose how to proceed in their educational career. A different nudge, *framing*, was used to reduce the negative feelings surrounding a topic. For example, teachers told their students that feedback was 'a gift', and one teacher called a resit a 'reparation'. During a classroom observation, a teacher encountered resistance when having their students take ten minutes to do an exercise. To reduce this, she told her students:

Ten minutes is nothing in game time. (VET-teacher, 61, female)

A less used nudge technique in this category was anchoring, where something is introduced as a reference point, to make something else seem better or worse. As an example, one teacher asked their students to make four out of six exercises, with the goal to make the four exercises seem less effort. Similarly, a teacher said the following:

We have core goals, they have to complete all of those, but also choice goals, where they get to choose from a list. (Teacher in higher education, female, 44)

Planned nudging

The last category, planned nudges, are structured interventions that require conscious preparation from the teacher and are harder to perform spontaneously. The nudge types commitment technique, identity nudge, changes in the physical environment, and the default nudge fall in this category.

Commitment technique. This nudge consists of asking students to commit themselves to a certain behaviour or outcome to create behavioural change. Some teachers allowed students to set their own goals and deadlines within the course. Students committed to these deadlines which helped them perform the relevant behaviour. Sometimes, a relevant cue for the desired behaviour was added, creating an implementation intention (Gollwitzer 1999).

For some students that [setting their own deadlines] works really well, and they can plan really well: 'I'm going to do that then, and it will be done by then.' And they can act on that. Other students really want to set a deadline but are not at all able to follow through. (VET-teacher, 61, female)

Other teachers involved the students in the creation of behavioural expectations (i.e. what kind of behaviours should students [not] show in class) in order to obtain their buy-in for those behaviours.

Students have been involved in the creation of their behavioral expectations and had a say in those. (...) We tell them: we prefer you eating and drinking in the hallway instead of in class, what do you think of that? [And they respond]: yes, we also want a clean classroom. (VET-teacher, 39, female)

The most extensive nudge of this type was a class trip at the end of the school year. Participation on this school trip was tied to grades and attendance. At the start of the year, students signed an agreement that they would attend class and get sufficient grades to be able to join the trip. Note that the nudge is not the class trip itself, but the students committing themselves to attendance and studying via the signed agreement.

This is how we apply pressure. Yes, you can join, we have a lot of fun stuff for you, but we want to see effort. It's okay to sometimes get an insufficient grade! But we want to see your effort. (VET-teacher, 51, male)

Identity nudge. In this category, changing behaviour is done by appealing to a student's current identity, a future identity (often the later work field), or a different identity altogether. For example, a teacher for a secretarial educational programme appealed to students' future identity by framing a lesson as a meeting. These students were asked to take the 'minutes' of these 'meetings', to promote their note-taking behaviour.

We try to make them (the students) conscious of the fact that they are students, and that they are developing. (Teacher in higher education, 53, female)

You've been marked absent this morning, that seems not like you. (VET-Teacher, 39, female)

A different teacher emphasised a more personal aspect of their students' identity after two students signed up for a nationwide contest:

You girls are badasses. (VET-teacher, 36, female)

Changes in the physical environment. In this category, the changed environment itself is what facilitates the new behaviour. These nudges usually consist of a change in proximity to the teacher which makes it more likely that students approach them or feel seen.

It starts with being there, first of all physically. (Teacher in higher education, 61, male)

Yes, I walk around and answer questions, and if you choose to do nothing, I'll prod you a few times, and if you still do nothing... well, that's your own business. (VET-teacher, 44, female)

On other occasions, teachers promote discussion by rearranging chairs or desks in a different shape, or have students stand during collaborative work to promote active behaviour.

We place the chairs closer to each other, and then we have a bigger desk and sit around it. And then we open the week. (VET-teacher, 40, female)

Lastly, sometimes classes were given in an environment that resembled their later expected workplaces to decrease unprofessional behaviour.

Default. A default nudge consists of making a certain option as the standard or pre-set option, making it the option that is chosen if no further input is given. A default nudge is a strong way to create behavioural change because no further input of the nudgee is required to achieve the intended behaviour. Despite its prevalence in nudging literature, only one example was found.

I tell students that are thinking about pursuing higher education: you should enroll before the 15th of May, you can always unenroll later. (VET-teacher, 44, female)

Additional findings

Teachers often were not aware of what a nudge is and how it can influence behaviour. Because of this, teachers sometimes nudge students towards the wrong behaviour. Several examples of this were found. The most common was teachers invoking a passive learning identity by calling their students ‘pupils’ instead of ‘students’, even when these teachers stated in the interviews that they preferred the term ‘students’. Calling their students ‘pupils’ can function as a nudge for their students reinforcing a ‘pupil’ identity that is more school-like and less autonomous than a ‘student’ identity. Furthermore, teachers often presented a social norm towards *not* doing homework:

There are a lot of people who have not yet started their assignment. (VET-teacher, 51, male)

Discussion

We intended to investigate what behavioural interventions teachers already use that can be classified as nudges, despite the only recent introduction of nudging literature in the educational field. The results showed that teachers use a diverse array of nudges, which can be categorised in three groups: intuitive nudges, didactic nudges and planned nudges. To reiterate: intuitive nudges are based on an instinctive understanding of human behaviour, didactic nudges correspond with didactic techniques that teachers already practice, and planned nudges are structured interventions that require conscious preparation. We found a difference between commonly used nudges and lesser used nudges. Additionally, we could identify nudges from existing literature that are not being used by teachers.

The most commonly used nudges were didactic nudges and intuitive nudges. They have in common that they all happen spontaneous and without preparation, stemming from a familiar repertoire. The lesser used nudges were in general the planned nudges, which often require more preparation. Although teachers in our study do not often use these nudge types – presumably through either unawareness or a lack of time – all these planned nudge types have already been demonstrated to be able to facilitate behavioural change in educational settings (for commitment, see Levy and Ramim 2013; for an identity nudge, see Walton and Cohen 2011; for changes in the physical environment, see Van den Berg, Segers, and Cillessen 2012; for a default nudge, see Page, Castleman, and Meyer 2018). Nudging techniques that fit this category could

therefore expand the teacher's toolkit to facilitate behavioural change in their students. The fact that didactic nudges in particular are often used, underlines how close the behavioural approach and the educational approach are in educational practice, even when they are seldom theoretically linked: the teachers apply their educational background to create behavioural interventions in their practice that can be classified as nudges.

The overview of used nudges also presents the opportunity to see what nudges are *not* being used. We look towards the framework of Hansen and Jespersen (2013), as its distinction between Type 1 and Type 2 nudges is relevant for nudging in education (Weijers, de Koning, and Paas 2021). Most of the nudge categories we found fall in the Type 2 category, which are nudges that change behaviour while also engaging the reflective system. Only the attention-based nudge, the change in physical environment, the default, and some nudges within presentation of information, fall within the Type 1 category. These are nudges that change behaviour only engaging the automatic system. This leaves room for development, as Type 1 nudges are preferred in situations with high cognitive load (Weijers, de Koning, and Paas 2021), but these were seldom practiced by the teachers.

Lastly, participants were often not familiar with the term nudging. While this is in congruence with the lack of integration of the fields of education and behavioural economics, this reflects a problem. Teachers are the choice architects of their classes, as they have a large degree of freedom and responsibility in how to fill in their lessons and classrooms (e.g. Putney and Broughton 2011). In education, this is similar to the concept of constructive alignment (Biggs and Tang 2014), where teachers are responsible for ensuring their instructional strategies and assessments align with their educational goals. Just as learning activities should align with learning goals, so should nudges. However, most teachers seemed unaware of their role as choice architects. In some cases, this unawareness of their own nudging led to teachers nudging their students in the wrong direction, away from the desired behaviour.

When interpreting these results, it should be noted that these findings are based on data from three schools in the Netherlands and are not necessarily generalisable. Additionally, the found nudges are not evaluated in the context of the didactic framework the teachers operate in, but as separate interventions. This leaves aside the interpretation of how a nudge fits and functions in a larger didactic framework, making possible integration of nudge techniques in educational theoretical frameworks more difficult. Future research could investigate how behavioural change theories could fit within these didactic frameworks. Finally, the nudges that are described were not evaluated for effectiveness. This approach, preferably focusing on the most-used nudges, is better suited for later quantitative research, using randomised controlled trials to determine the effect of specific nudges on students' behaviour.

Conclusion

Although the fields of behavioural economics and education are not traditionally integrated, the technique of nudging applied on a relatively large scale in education. This study has provided a first step towards this integration by presenting an overview of existing nudges used by teachers: currently used nudges can be classified as instinctive,

didactic, and planned nudges. The unawareness of teachers about nudging, combined with the lack of Type 1 and planned nudges practiced in education, leads to a new question: can new nudges, especially those that fall in these categories, change behaviour in an educational context? New nudges for educational practice should be designed and tested in practice, preferably with the help of teachers who have been informed about theoretical principles of nudging. Alternatively, nudges already used by teachers in practice should be experimentally tested for their effectiveness, as research on nudge interventions in education is sparse. Given the omnipresence of some of these nudges, such as feedback and the reminder nudge, it is relevant to study these nudges and check whether they are actually successful in facilitating desired behavioural change in students. On a more theoretical level, it would be interesting to see what the connection between the research fields behavioural economics and education yields, now that relevant nudging literature can be applied to existing behavioural interventions in education. With these steps, the fields of behavioural economics and education can come closer, both theoretically and in practice, in how they approach behavioural change, benefiting both fields.

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Ethics approval

The study was conducted in accordance with the code of ethics for the social and behavioural sciences endorsed by all universities in the Netherlands, as well as the guidelines of the Department of Psychology, Education and Child Studies of Erasmus University Rotterdam. Informed consent was obtained from all participants. Consent forms can be found on the Open Science Framework.

Data availability statement

The used data and analysis can be found on the Open Science Framework (https://osf.io/7fu94/?view_only=7da27ebf1f9447d181424d7758fd8954)

Authors' contributions (optional: please review the submission guidelines from the journal whether statements are mandatory)

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Robert Weijers. The first draft of the

manuscript was written by Robert Weijers and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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