RETURN OF THE BEHAVIOURAL PARADIGM?

The Discourse on Nudging in Higher Education Research

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Abstract

Using nudges to influence individual behaviour has become increasingly popular with higher education managers designing the processes and environment of teaching and learning. As a concept derived from behavioural economics, our knowledge on the causes and consequences of nudging predominantly originates from other disciplines, and a specific reflection in the light of higher education is scarce. Or is it? This study elucidates the current state of the scientific discourse on practices of nudging in the context of higher education teaching and learning by conducting a systematic meta-synthesis. Results show that the complex ethical problems that accompany the practical applications of nudging are only marginally discussed in higher education research. Instead, the discourse is dominated by a behavioural mind-set alien to modern perceptions of teaching and learning. By highlighting this blind spot, this study paves the way for future empirical research scrutinizing the consequences of the latent return of the behavioural paradigm.

Keywords: Nudging, Higher Education, Behavioural Paradigm, Systematic Review, Research Synthesis.

Introduction & Theoretical Background

Nudging is a hot topic in the field of (public) higher education management and policy, spawning forth behavioural insights teams every other week (Ly et al. 2013, Desouza & Smith 2016, Lodge & Wegrich 2016, OECD 2017). The goal of nudging is to increase efficiency and efficacy of human behaviour in (public) organizations such as institutions of higher education. Many researchers argue that exploring and using the boundaries of human rationality for pro-social causes can also help to improve individual decision making and even promote individual success, environmental protection, and happiness (Thaler & Sunstein 2008, Sunstein & Reisch 2014, Gigerenzer 2015). The idea of nudging acknowledges that human decision making is systematically and often unconsciously biased. Very often, a small push – a *nudge* – into the right direction could have great beneficial consequences or might prevent great harm at minimal cost. The process of nudging hopes to prepare organizations, systems, and processes accordingly in order to help people make decisions that are beneficial to their own goals (Thaler & Sunstein 2008). In the context of higher education teaching and learning, for instance, nudges derived from insights of behavioural economic research[1] can be useful in helping to create study and curriculum management systems that help to reduce stress by intuitively helping to get enrolled in the right course at the right time – and not forget to opt-in for the obligatory exam at the end of term (Ly et al. 2013).

Other researchers, for instance Lynch (1997) and Kloss (1994), have argued that nudging as learner-centred interventions can also have very beneficial effects on students' leaning outcomes. But is it feasible to use nudging as the process of stirring behaviours toward what is

[1] The body of research in behavioural biases is vast and, consequently, so is the multitude of forms and applications of nudges. For an introduction to bounded rationality, heuristic decision making, and cognitive distortions that are often referred to in the context of nudging please refer to, for instance, Raghubir & Menon (1998), Kahneman et al. (1990), Kahneman (2003), Parisi & Smith (2005), Dolan & Sharot (2012), and Johnson et al. (2012).

regarded as mutually beneficial, and produce welfare-optimal outcomes in the context of higher education teaching and learning?

The idea that human decision making is not always rational is not completely alien to the scholarship of teaching and learning and educational science in general. Traditionally, the process of teaching and learning can be analysed by following one of three well-established paradigms: the *behavioural paradigm*, the *cognitivist paradigm*, and the *constructivist paradigm*. First, the *behavioural paradigm* is essentially rooted in the behavioural mind-set of learning as the development of cue-based and automatic responses to external or internal stimuli. Following this mechanical concept of behaviour (i.e. a fixed stimulus-response mechanism), learning could be defined as the specific process of increasing, extending, and enhancing the ability of one individual actor to respond to certain internal or external cues in a specific way (Gräsel & Gniewosz 2011). In this sense, i.e. viewing learning as a process of conditioning, learning enables students to respond to similar cues in the future efficiently and in a specific manner that is regarded to be adequate. It is clear that the very idea of using nudges – for instance to foster students' and teachers' motivation and their learning and teaching effort – is implicitly but directly linked with this behavioural paradigm of learning. The mechanical view on human behaviour does not necessarily correspond well with more recent and by now well-established insights into student motivation and learning success that represent the current state of research in psychological, educational, and organizational sciences (among many others e.g. Meyers 1986, Garrison & Kanuka 2004, Kolb & Kolb 2005, Klauer & Leutner 2012, Reinmann 2013, Schneider & Mustafić 2015).

In contrast, the second paradigm, the *cognitivist paradigm*, identifies learning as the acquisition of both tacit and implicit but ontologically factual knowledge (Klauer & Leutner 2012). Research following this perspective – e.g. Spitzer (2000) – argues that higher education efficiency is achieved when the process of teaching succeeds in creating new

foundations of knowledge, skill, and curiosity and and hence fosters a self-enhancing motivation to continue this learning process. In this sense, the role of the teacher still holds hierarchical quality in its task of setting the goals, directions, and boundaries of students' learning experience. The third paradigm, the *constructivist paradigm*, characterizes learning explicitly as an interactive process between both individual and collective actors that collaboratively create new knowledge through their interaction (Klauer & Leutner 2012). This last paradigm closely follows the idea of knowledge as a common and socially-constructed ever-changing entity (Hess & Ostrom 2007)

Which paradigm of teaching and learning underlies the discourse of nudging in higher education? Nudging is an idea that is grounded in the fundamental paradigm of classical economic theory. Will its growing popularity correlate with a return of a behavioural view on teaching and learning? This study explores the current discourse on the effects of using nudges in the context of teaching and learning paradigms to understand if and how nudging is reflected upon by the scientific community in higher education research. The next section explains the methodology and procedure of the systematic review conducted in this paper to substantiate the evidence extracted from the body of the current discourse in leading international higher education journals. This evidence is further explored by conducting a meta-analysis of the discourse structure and a meta-synthesis of the discourse contents. Findings are presented and discussed subsequently, closing this paper with a call for future research.

This study adds to the existing body of literature in three major ways: First, it produces new insights into the latent return of the behavioural paradigm into the design and organization of configurations of teaching and learning in institutions of higher education. Second, it shows how the idea of using nudges to stimulate learning motivation may, in fact, have contra-intentional results in the long run since it biases the discourse toward a retrospective

perception of teaching and learning. Third, it indicates that the relative acceptability of systematic nudging in the context of higher education is related to idiosyncratic conceptions of the purpose of higher education and the first signs of a latent and emergent change of these. This study is unique in its focus on the dark side of applying insights from behavioural economics to stir individual behaviour from an ethical as well as from a managerial perspective, eventually setting a rich agenda for future empirical research to further explore the effects of nudging on both learning and teaching practices.

METHODOLOGY: DISCOURSE ANALYSIS AND DISCOURSE SYNTHESIS

The empirical evidence of this study is based on a systematic interpretative analysis of the structure of the current body of research dealing with the application of nudges in higher education teaching and learning. This method of interpretative inductive qualitative research synthesis combines a number of primary pieces of research to generate novel insights by synergistically and systematically consolidating and contrasting the current state of knowledge on a meta-level of analysis (Hoon 2013).

The methodology of this research technique follows three consecutive steps. First, the study material is carefully selected and the research question is framed through a-priori specification based on existing literature. Second, a preliminary synthesis is conducted to organize and broadly categorize the insights derived from the primary material by using well-established qualitative research methods. Third, this preliminary synthesis is interpreted and further aggregated on a cross-study level by examining the central research question (of the study) and by connecting the emergent patterns and relationships of the core concepts identified in the primary synthesis to other theoretical perspectives to develop a new theory or to identify gaps in the current scientific discourse (Hoon 2013).

Material Selection and Inclusion & Exclusion Strategy

The empirical material of this study consists of a selection of N=19 research articles, both empirical and conceptual, that have been published in international top-tier peer-reviewed journals until 9th August 2017. Internationally, the scientific discourse on nudging in higher education is spread throughout a number of disciplines with two core areas, one focussing on higher education didactics, communication science, and psychology and the other focussing on socio-political, organizational, and managerial sciences with a special interest in higher education research. For the synopsis of this study, prior findings originating from 23 journals were selected, a short-list of which was determined based on three journal rankings in order to identify the most relevant outlets of research in this field of scholarship: The first ranking focussing on higher education didactics is provided by the Early Career Higher Education Research Network and comprises 33 journals that can be accessed through (August 9th 2017). The second ranking comprising 11 journals is provided by Verband der Hochschullehrer für BWL e.V. and can be accessed through http://vhbonline.org/vhb4you/jourqual/vhb-jourqual-3/teilrating-hsm/ (August 9th 2017). It focusses on issues of managing processes of teaching and learning in higher education. Both lists were matched with the output retrieved from the SCImago Journal & Country Rank data base (August 9th 2017), which comprises a total of 48 international journals categorised as relevant for 'higher education' with a general perspective to guarantee relevance. Journals were selected according to their five-year impact factor, the requirement of peer-review, and the fact that they were still active in 2017. Table 1 (in the appendix) provides a comprehensive list of the journals selected as well as the number of articles that were retrieved from each journal by performing a systematic query search of the keywords of 'nudge', 'nudging', and 'nudg*' through the search function on the respective journal webpages. For relevance, only full journal articles that focussed on the process of teaching and learning were included excluding editorials and book reviews. Table 1 provides a detailed overview of the final selection and the journals retrieved.

FINDINGS & DISCUSSION

Procedure: Discourse Analysis and Subsequent Discourse Synthesis

As a first result of the systematic selection of the material, it becomes obvious that the scientific discourse on nudging and its application to the context of higher education teaching and learning is still a nascent area of research calling for a more conceptual approach to research synthesis to consolidate the current body of knowledge (as a second step). While in many disciplines meta-research focusses on a quantitative aggregation of existing evidence, this approach is not feasible with the current state of evidence and, instead, a qualitative approach was applied. Consequently, the material was analysed with an elucidative synthetic instead of an aggregative bibliometric approach: In a first step, the discourse is analysed for meta-structure within the different international outlets of higher education research. In a second step, the content of all original articles retrieved was synthesised in a translational synthesis process as described by Hoon (2013: 521-523). Meta-synthesis as *translation* follows a constructivist ontology of research that does not focus on the key findings of primary research but on the interpretation of why the authors of primary studies that serve as empirical study material create and interpret their world in a certain way.

Discourse Analysis: The Prevalence of "Nudg*" in Higher Education Research

The second finding is evident from Table 1: Out of 23 journals, only 11 journals have so far published research with a direct focus on nudging. This is surprising in the light of the vivid discourse on this topic in outlets aiming at practitioners, for instance Ly et al. (2013) and Desouza and Smith (2016). The journals that actually have published research on nudging are spread evenly across international publishers, and research in nudging is distributed almost evenly across the full spectrum of higher and lower impact outlets (see Table 1). However, the publication of research focussing on nudging is currently skewed toward journals with medium and lower impact factors. Most journals comprise but a single article, and articles are

distributed evenly across the whole body of scholarly journals irrespective of any specific thematic focuses of the respective journals. However, it is striking that higher education journals with a strategic focus on economics, political science, and management (Economics of Education Review; Journal of Higher Education Policy and Management; Higher Education Research & Development; and European Journal of Education Research, Development and Policy) publish research on nudging more frequently than other outlets and, consequently, lead the discussion. The aforementioned journals published 12 out of the total 19 articles retrieved (63.2%), and it is noticeablethat publication frequency of nudge-themed research in journals of higher education has increased in recent years (see Figure 1).

Insert Figure 1 about here

It is certainly not feasible to draw causal conclusions based on bibliometric evidence deduced from a small-size sample of articles. However, it is obvious that ideas about human behaviour, which were originally developed in the realm of administrative organizational behaviour (Simon 1945, 1979), risk and financial decision making (Kahneman 2003; Thaler & Bernatzi 2004), and consumption behaviour (Thaler & Sunstein 2008), have found outlets in various international and high-impact journals (see Table 1) of the higher education discourse. Consequently, the third result (derived from the pre-analysis of the discourse on nudging in higher education) is the fact that there is a growing attention given to the topic of nudging in higher education teaching and learning research. The discourse, however, is mainly driven by only a small number of outlets that are traditionally closer to the economic and (public) management perspective on higher education than to the perspective of educational or pedagogic science. This is problematic since nudging has the direct purpose to influence

individuals' behaviour not only in organizations providing the *context* of teaching and learning but also their behaviour in the very *process* and *practice* of teaching and learning.

Having analysed the structure, outlet, and concentration of the current international discourse on nudging in higher education research to identify the paramount streams of thought, the following paragraphs examine more closely the contents and philosophical foundations of this discourse by synthesizing the 19 articles retrieved.

Discourse Synthesis: Paradigms of teaching and learning in the nudging discourse

In the light of the theoretical background of the three classic paradigms of teaching and learning, each of the 19 articles was systematically coded and analyzed for its underlying paradigm of teaching and learning to characterize its ideological position on nudging within the current discourse: Besides explicit and content-related referrals in the body of texts, the argumentation applied by the authors of the papers was screened and coded systematically for the explicit or implicit prevalence of the three paradigms. Adhering to the definitions described in the introductory paragraphs, the three paradigms were identified in an iterative coding process analysing the *concept of nudging* described in the primary studies. These studies were analysed with regard to the following aspects: the authors' *theoretical focus*, their *definition* of nudging, their *attitude* toward nudging, their general *mind-set* as reflected by their argumentation – especially in their discussion section – as well as the *explicit theoretical background* of their study. Table 2 presents the result of this synthesis in detail.

Insert Table 2 about here

Two indicators were used to code the retrieved articles in order to identify the dominant paradigm they implicitly follow. In a first step, the articles were screened for an implicit or explicit definition of nudging. In a second step, all retrieved papers were analyzed for the

prevalence of one or more of the three dominant paradigms by an in-depth, recursive analysis of (a) the explicit theoretical background authors referred to by citation, (b) the explicit terms used in the narrative of the articles, and (c) the authors' evaluation of nudging when they describe students-teacher interactions, as well as (d) the explicit description of one or more of the three dominant paradigms. The results of this analysis are presented in the subsequent paragraphs.

Definitions of nudging in the current discourse

Prior research by Desouza and Smith (2016) showed that there are various definitions of what nudging constitutes. The analysis reveals that there is indeed a variety of nudging concepts. Often, the authors only vaguely define their concepts. Yet, the authors' understanding of what nudging is can be aggregated into three distinct concepts: First, [Collier (1985), Levin & Koski (1998), Wolverton (1998), Vlachopoulos & Cowan (2010), Delaney et al. (2013), Stevens (2015), Wastiau (2015), Bird et al. (2016), Page & Scott-Clayton (2016), Duchini (2017), and Gunn & Mintrom (2017)][2] understand nudging as a stimulus, a trigger, or an intervention to immediately affect individual behaviour.In the case of [Stevens (2015)], it should be used to increase students' motivation and engagement or to foster non-forced compliance [Gunn & Mintrom (2017): 28]. Wastiau (2015: 395) even defines nudging explicitly as a behavioural trigger "[t]o force (or nudge) entirely self-interested individuals to achieve better [outcomes …]" while Wolverton (1998: 25) refers to nudging as the process of "conspicuous[ly …] coaxing institutional members to move beyond their normal, operational comfort zones". Framed in a more positive way, Collier (1985: 10) characterizes nudging as motivation through subtly guiding and, thus, empowering teaching practices. However, it is

[2] Please note that citations in [] refer to the articles identified as part of the nudging discourse in the higher education research and, thus, indicate the articles used as evidence for argumentation in the current essay.

clear that there is an underlying assumption that there *is* and can actually be a benchmark of "better outcomes" and that this benchmark has to be set explicitly and externally.

A second stream of research implicitly refers to nudging as a decisive boundary setting by empowered actors to direct the macro-behaviour of groups of actors, e.g. the whole body of university staff or a whole class of students. [Thody (1989), Marginson (1997), Levin & Koski (1998), Justice et al. (2007), Baker (2017), and Peacock & Cowan (2017)] use this definition. As Thody (1989: 291) points out, these boundaries are likely to be set by external stakeholders that exercise power over members of an organization of higher education through hierarchical or political power structures. On the other hand, Cowan (2014: 58) points out that nudging as a boundary setting enables students to learn in a self-directed and goal-oriented way and mentions the positive aspects of nudging as a "good" teaching practice in contrast to "force feeding" (2014: 58) students. Cowan and colleagues are one group of only few researchers who, in this discourse, argue from the point of few of a scholarship of teaching and learning that transcends mere considerations on nudging as a tool to increase (economic) efficiency.

The third stream of research regards nudging as a latent network of norms, checks and balances that directs both individual and collective behaviour but – in contrast to the second stream of research – is not directed by anyone specifically. The invisible colleges implicitly described by [Green (2005): 294-296] that foster learning and individual professional development through network effects over time are one good example of this mind-set. This collegiality is mirrored by Bolden & Petrov's (2014) position of nudging as an empowerment of individuals to steer their colleagues into certain behavioural directions and, thus, emerge as open or implicit peer group leaders to the mutual benefit of all actors involved.

The majority of articles communicate a positive view on nudging in the context of higher education teaching and learning, emphasizing the benefits and great potential of nudging. Only [Thody (1989), Marginson (1997), Wastiau (2015), and Duchini (2017)] express skepticism on the legitimacy of nudging in the light of the many non-economic goals of institutions of higher education.

Explicit references to behavioural and educational theories

The majority of articles dealing with nudges explicitly refer to classic titles in the field of bounded rationality [Delaney et al. (2013), Bird et al. (2016), Page & Scott-Clayton (2016), Baker (2017), and Gunn & Mintrom (2017): (Simon 1955, Kahneman & Tversky 1979, Thaler 1980, Schmidt 1983, Jacoby 1984, Sundstrom 1987, Thaler & Bernatzki 2004, Dynarski & Scott-Clayton 2006)] and nudging as goal-oriented choice architecture design based on the idea of libertarian paternalism [Bolden & Petrov (2014), and Baker (2017): (Gronn 2000, Thaler & Sunstein 2008, Gosling et al. 2009, Johnson et al. 2012, Lumby 2013)]. Furthermore, articles implicitly following the behavioural paradigm of teaching and learning explicitly refer to the effort invested into learning in higher education as a rational cost-benefit analysis, following closely the arguments made by human resource and human capital theory [Levin & Koski (1998), Wolverton (1998), Delaney et al. (2013), Bird et al. (2016), and Page & Scott-Clayton (2016): (Lewin 1938, Becker 1964, Baumol 1967, Furubotn & Pejovich 1972, Mintzberg 1989, Senge 1990, Levin 1991, O'Tool 1995, Borghans et al. 2008)] that call for active policy leadership to successfully navigate human behaviour through organizational and institutional complexity [Thody (1989), Delaney et al. (2013), Bolden & Petrov (2014), and Bird et al. (2016): (Campbell 1957, Mintzberg 1973, Cohen & March 1974, Müller-Seitz 2012)].

Only few articles explicitly built their argumentative narrative on ideas based on educational concepts of teaching and learning. [Cowen (2014), Peacock & Cowen (2017)] draw on both

economic theories: human capital and competence theory (Anonymous 1981) and educational or pedagogic reasoning on self-directed learning and learner centrality (Bloom 1956, Rogers 1969, Day 1993). By drawing on theories by Newman (1959), Foucault (1988), and Gordon (1991), [Marginson (1997)] further elaborates on the innate conflict between managerial, educational, and scientific logics in the context of higher education that is intensified by the extensive use of nudges. Also [Wastiau (2015)] refers to the network and commons theory by Levine (2007) and Ostrom (2010) when pointing out that the extensive use of nudging in the context of higher education could, in fact, hinder the process of learning as a co-creative network activity to grow a "[p]attern of [k]nowledge" (2015: 394-395) and "aggregat[e …] billions of individual data, each part of which is worthless in isolation" (2015: 395) into the shared collective good that is knowledge. Likewise, [Green (2005), Justice et al. (2007), and Stevens (2015)] draw on ideas of learning as the multi-directional, collaborative process of co-creation and co-evolution of knowledge based on Vygotsky (1978), King (1993), Justice et al. (2002), and Neary (2010).

As a fourth result, it is evident/The forth result is the observation that the most dominant paradigm in the current discourse on nudging in higher education teaching and learning research is the *behavioural paradigm* with N=9 articles being identified as strictly following this behavioural perspective [Thody (1989), Levin & Koski (1998), Wolverton (1998), Delaney et al. (2013), Bolden & Petrov (2014), Bird et al. (2016), Page & Scott-Clayton (2016), Baker (2017), Gunn & Mintrom (2017)]. Two further articles use arguments characteristic for both the behavioural and the cognitivist paradigm [Collier (1985); Duchini (2017)]. Four articles were code-scored purely for the cognitivist paradigm [Vlachopoulos & Cowan (2010), Cowen (2014), Stevens (2015), Peacock & Cowan (2017)] while two articles used arguments characteristic for both the cognitivist and the constructivist paradigm [Green

(2005), Justice et al. (2007)]. Finally, two articles [Marginson (1997), Wastiau (2015)] purely followed the constructivist paradigm. Figure 2 illustrates these findings graphically.

Insert Figure 2 about here

The sample is slightly dominated by articles applying qualitative research methods such as biographic or case study reviews and narrative reviews (N=14) against N=5 quantitative studies researching primary and secondary panel, survey, or network data, respectively. Four out of these five quantitative studies follow the behavioural paradigm and not a single one of these five studies follows the constructivist paradigm.

Limitations

Certain limitations on the present study (strongly) encourage future research. Although this study is the first to systematically identify critical issues in the application of nudges in the context of higher education, its empirical evidence is based on a cursory synthesis of the current scientific discourse. This discourse is still emerging, and empirical research on nudging in higher education (research) is scarce. Furthermore, the study explicitly focussed on scientific journals explicitly located within higher education research. Other fields of study could also have produced insights into nudging in the context of higher education without explicitly using the term “nudge”. Consequently, the external validity of this study is limited and should be scrutinised by future studies conducting systematic quantitative, bibliometric, and case-study research once the field is more mature. Furthermore, systematic bibliometric studies with a broader scope of journals dealing with nudging in higher education teaching and learning – which might not explicitly call this practice “nudging” – will yield deeper insights into the status quo of nudges from the perspective of educational philosophy.

DISCUSSION: THE PREDOMINANCE OF THE BEHAVIOURAL PARADIGM

As the preliminary discourse analysis shows, a stream of thought originating from economic and managerial paradigms of human behaviour seems to dominate educational and pedagogic ideas on the discussion of nudging in higher education. Consequently, the central finding of this study is that more critical reflection is needed on what nudging does to the scientific discourse.

The lack of critical reflection of the philosophical paradigm underlying the use of nudging in higher education research and practice is striking. It is especially problematic since it disregards more than 40 years of functional development in the understanding of how teaching and learning functions. Furthermore, the body of empirical evidence of nudging in higher education pays little attention to the philosophical role of cognitivist and constructivist perspectives on knowledge generation through teaching and learning. This is problematic because nudging implicitly stresses the behavioural perspective of learning as a mono-directional process that needs to be stirred by a teacher or an institution. This does not take into account the vast body of research that shows that learning is in fact an interactive and collaborative process and that learning motivation is not only stimulated by external incentives but that students are also intrinsically motivated to learn.

There is growing interest in the use of nudging in the context of higher education teaching and learning. However, the systematic analysis and synthesis of the current scientific discourse in leading international journals of this field of study provides evidence that – as to now – research has neglected the potential pitfalls of nudging. Failing to realize that nudging is fundamentally based on a hierarchical mind-set that puts the individuals that are being nudged into a vulnerable and inferior position, is alarming and strongly calls for more in-depth research on nudging. Practitioners that decide to use nudges for motivation or rule adherence, to name just a few of the potential fields in which nudges are used, need to be aware that this

increase in immediate efficiency of behaviour might come at unforeseeable long-term costs of decreasing incentives to collaborative, self-regulated and social constructive learning activities. If university teachers are more and more encouraged to believe that their students *need* to be nudged in order to learn, teachers might feel discouraged from creating collaborative learning environments and might refrain from experimenting with non-frontal teaching methods.

However, the current study does not deny that nudging might have beneficial consequences for university students and teachers alike. For instance, nudging in the form of easing organizational tasks can be very helpful for busy undergraduate freshmen who find it hard to organize their study programme and enrol for obligatory classes and mile-stone exams in time. In this case, students might benefit from an IT-system that nudges them to adhere to the formal regulations of their study programme by automatically setting the default on "enrolled to exam" whenever they opt to attend a certain class so that they have to explicitly sign out if they want to do the exam at a later point in time. Another example for organizational nudging could be to install automatic e-mails that would remind teachers in time to remember approaching organizational deadlines for publishing exam results at the end of the term. Even these seemingly trivial issues are nudges that influence behaviour. However, the spectrum of nudging goes from these little cues to help in becoming more organized and in preventing stress to the full opposite of the spectrum, i.e. to explicitly stir and *change behaviour in a certain way* – and often without the knowledge of the people being nudged. How does this fit with the idea of academic freedom? Will the return of the behavioural paradigm through the back-door of nudging change our understanding of the purpose and higher ends of higher education? The truth is that we do not know. As to now, the scientific discourse has paid little attention to the ethical aspects and to the ontological consequences of using nudges in higher

education teaching and learning. Hence, future research on teaching and learning can explore behavioural biasing in more depth.

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TABLE 1 Primary Analysis: Selection of Scholarly Journals <<< Appendix >>>

No.	Journal Title	Publisher	Impact factor	H-Index	Number of papers including 'nudg*'	Relevant paper(s) retrieved
1	Academy of Management Learning & Education	Academy of Management	2.426	51	3	0
2	The Review of Higher Education	The Johns Hopkins University Press	1.929	45	0	0
3	The Journal of Higher Education	Taylor & Francis	1.883	49	10	0
4	Economics of Education Review	Elsevier	1.868	62	10	Delaney et al. (2013); Page & Scott-Clayton (2016); Duchini (2017)
5	Higher Education Quarterly	Wiley	1.810	18	13	0
6	Review of Research in Education	Sage	1.727	116	0	0
7	Journal of Higher Education Policy and Management	Taylor & Francis	1.650	29	5	Wolverton (1998); Bolden & Petrov (2014); Gunn & Mintrom (2017)
8	Research in Higher Education	Kluwer Academic	1.500	64	4	Bird et al. (2016); Baker (2017)
9	Active Learning in Higher Education	Sage	1.258	27	3	Vlachopoulos & Cowan (2010); Cowan (2014)
10	Studies in Higher Education	Taylor & Francis	1.222	71	16	Thody (1989)
11	British Educational Research Journal	Wiley	1.214	66	12	0
12	Higher Education	Kluwer Academic	1.207	68	0	0
13	Higher Education Research & Development	Taylor & Francis	1.206	29	7	Collier (1985); Marginson (1997); Green (2005)
14	Comparative Education Review	The University of Chicago Press	1.130	39	8	0
15	Innovative Higher Education	Springer	1.120	28	5	Justice et al. (2007)
16	Assessment & Evaluation in Higher Education	Taylor & Francis	1.075	61	2	0
17	British Journal of Educational Studies	Taylor & Francis	0.977	36	5	0
18	Educational Research	Taylor & Francis	0.909	41	4	0
19	European Journal of Education Research, Development and Policy	Wiley	0.906	27	3	Wastiau (2015)
20	Journal of Further and Higher Education	Taylor & Francis	0.890	11	5	Peacock & Cowan (2017)
21	Teaching in Higher Education	Taylor & Francis	0.814	37	2	Stevens (2015)
22	Higher Education Policy	Palgrave Macmillan	0.727	31	4	0
23	New Directions for Higher Education	Wiley	0.320	26	9	Levin & Koski (1998)

Table 2 Main Analysis: Qualitative Discourse Synthesis <<<Online appendix>>>

No.	Primary Research	Concepts of nudging described in primary study	Preliminary synthesis	Secondary synthesis: Paradigm identified
1	**Baker (2017): Understanding College Students' Major Choices Using Social Network Analysis.** **Method:** Quantitative network analysis. **Goal:** Increase study success and foster student persistence (sticking with one study subject instead of following "suboptimal pathways" through accumulating more credit points than needed or not graduating at all). Increase graduation numbers. Support the shift in perspective from how to motivate students to how to design processes to nudge students to do what they are supposed to.	**Focus:** Nudging as guided pathway interventions regarding study management to simplify student decision making by pre-clustering majors. Nudging as structural reforms to guide behaviour and reduce choice complexity. **Attitude:** Positive.	**Mind-set:** Positivist, behavioural. Recognizes heterogeneity among students but strives to "exacerbate inequality" among study experiences, "increase efficiency" in college management, and intervene by reducing choice (complexity) for "maximum impact" on student behaviour. **Explicit theoretical background:** Bounded rationality (Simon 1955, Kahneman & Tversky 1979, Thaler 1980, Jacoby 1984, Sundstrom 1987), and choice architecture designing (Thaler & Sunstein 2008, Johnson et al. 2012).	Behavioural.
2	**Bird et al. (2016): Here Today, Gone Tomorrow? Investigating Rates and Patterns of Financial Aid Renewal Among College Freshmen.** **Method:** Quantitative secondary analysis of panel data. **Goal:** Increase student aid application and increase renewal/refile rates through interventions especially for students with "good academic standing". Support "students through the complex financial aid application process", thus "improv[ing] postsecondary outcomes for economically-disadvantaged students" and increase economic efficiency of funding programme. Nudging to equalise chances.	**Focus:** Nudging through goal-specific, directed messaging; Nudging as trigger. **Attitude:** Positive.	**Mind-set:** Behavioural psychological (stimulus → intention → response). **Explicit theoretical background:** Bounded rationality under complexity (Thaler & Bernatzi 2004, Dynarski & Scott-Clayton 2006), and higher education as cost-benefit analysis and human capital theory (Becker 1964)	Behavioural.
3	**Bolden & Petrov (2014): Hybrid configurations of leadership in higher education employer engagement.** **Method:** Qualitative case study analysis.	**Focus:** Nudging as empowerment of individuals who steer their colleagues into certain behavioural directions	**Mind-set:** Context dependent behaviour, choice as consequence. **Explicit theoretical background:** Organizational behaviour under complexity (Lumby 2013, Gosling et al. 2009), hybrid	Behavioural.

	Goal: Explore phenomena of distributed and emergent leadership in higher education management and its effect on employee behaviour.	(emergent or implicit leaders). **Attitude:** Positive.	and network leadership theory (Müller-Seitz 2012), and choice architectures (Gronn 2000).	
4	**Collier (1985): Teaching Methods in Higher Education: The Changing Scene, with Special Reference to Small-group Work.** **Method:** Literature review. **Goal:** Systematic assessment of classical methods of teaching and learning techniques in the context of a changing paradigm of teaching and learning.	**Focus:** Nudging as motivation through subtly guiding and, thus, empowering teaching practices. **Attitude:** Positive.	**Mind-set:** Both cognitivist ("provisionally nature of learning" p. 5, "[positive] shift from surface to deep processing" p. 10), and behavioural: context dependency of learning attitudes (institutionalism), hierarchy (need for authority of teacher p. 10), and teaching as the process of nudging students "into their own unhurried exploration of issues" p.10. **Explicit theoretical background:** Learning taxonomy (Bloom 1956).	Cognitivist & behavioural.
5	**Cowan (2014): Noteworthy matters for attention in reflective journal writing.** **Method:** Literature review. **Goal:** Summarise best practices for students' academic self-reflection through meta-cognitive journal writing.	**Focus:** Nudging as enabling self-directed learning through "good" teaching practices instead of "force feeding" (p.58). **Attitude:** Positive.	**Mind-set:** Cognitivist (teacher's guidance as facilitation of learning in a restricted socio-cognitive (p.57-58), pseudo-constructivist process of learning, Postman & Weingartner 1971). **Explicit theoretical background:** Reflection (Boud et al. 1985), meta-cognition, hierarchy of learning outcomes (p. 55), "[a]chieving worthwhile depth of reflection" (p.57). Learner centrality (Day 1993).	Cognitivist.
6	**Delaney et al. (2013): The role of noncognitive traits in undergraduate study behaviours.** **Method:** Quantitative analysis of primary panel data. **Goal:** Exploring the influence of noncognitive traits of behaviour – i.e. lecture attendance, their socio-demographic status and psychometric character traits – on study success.	**Focus:** In interpretation of findings: Nudging as stimulating at-risk students to inhibit inferior choices ("choices that they would change if they had […] no lack of willpower" p. 190) through specifically	**Mind-set:** Academic achievement equals learning efficiency (p. 182), context dependency of learning ("micro-level determinants of lecture attendance" p. 181, 184, 190). **Explicit theoretical background:** "[L]ibertarian paternalism" (Thaler & Sunstein 2003), attention economy (Schmidt	Behavioural.

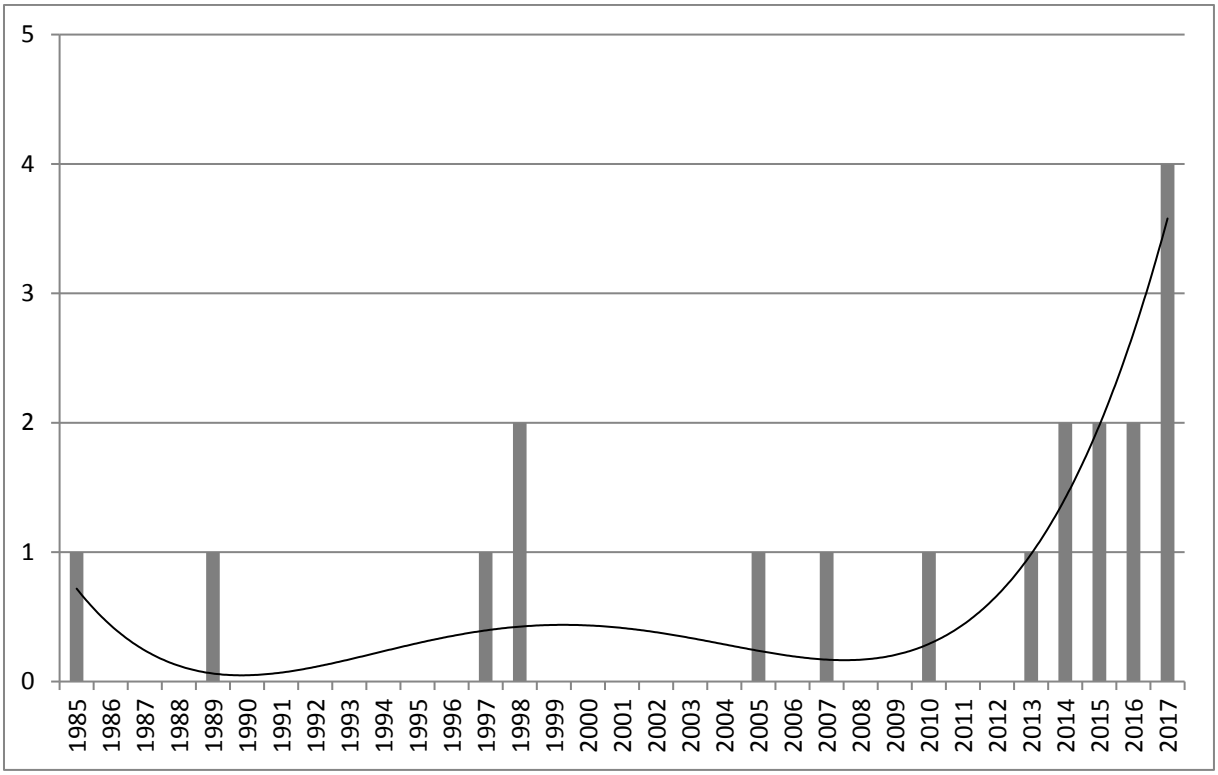
		designing institutional contexts. **Attitude:** Positive.	1983), Human Resource Theory (psychometric properties as behavioural primes: Borghans et al. 2008).	
7	**Duchini (2017): Is college remedial education a worthy investment? New evidence from a sharp regression discontinuity design.** **Method:** Quantitative analysis of primary enrolment and matched panel data. **Goal:** Investigate intervention effect of college remedial programmes on students' persistence and performance. Critical.	**Focus:** Nudging as intervention. **Attitude:** Critical	**Mind-set:** Human Resource Theory: academic achievement equals learning (p. 38), context dependency of learning, both behavioural psychological (intervention → motivation→ response, Scott-Clayton 2011) and cognitivist ("money may well be necessary but insufficient to improve college outcomes" citing Scott-Clayton (2011). **Explicit theoretical background:** n/a.	Behavioural & cognitivist.
8	**Green (2005): Spaces of influence: A framework for analysis of an individual's contribution within communities of practice.** **Method:** Qualitative analysis of biographical narratives. **Goal:** Exploring John Bowden's spaces of influence in the creation of knowledge in a community of practice.	**Focus:** Nudging as implicit learning through invisible colleges that over time foster individual professional development through network effects (p. 294-296). **Attitude:** Positive.	**Mind-set:** Scholarship of teaching and learning, invisible colleges, network learning (p. 299), Reflexivity (p. 306). **Explicit theoretical background:** Learning as cognitive change in zones of proximal development (Vygotsky 1978).	Cognitivist & constructivist.
9	**Gunn & Mintrom (2017): Evaluating the non-academic impact of academic research: design considerations.** **Method:** Narrative review. **Goal:** Conceptualizing the role of research evaluation on the impact of scientific research outside of the academy.	**Focus:** Nudging as stimulation through institutionalized incentive to steer extrinsic motivation (non-forced compliance p.28). **Attitude:** Positive.	**Mind-set:** Behavioural reinforcement (stimulus → intention → response), context dependency of research motivation. **Explicit theoretical background:** Policy making through nudging (Thaler & Sunstein 2008).	Behavioural.
10	**Justice et al. (2007): Inquiry in Higher Education: Reflections and Directions on Course Design and Teaching Methods.**	**Focus:** Nudging as goal-oriented design of learning environments and	**Mind-set:** Teaching and learning as multi-directional, collaborative, longitudinal, and recursive process (p. 207-208). However,	Cognitivist & constructivist.

	Method: Design-based research (5-year experiment). **Goal:** Establishing inquiry-based learning as a means to stir self-directed learning and student motivation.	institutional contexts of teaching and learning; process engineering. **Attitude:** Positive.	active role of lecturer ("we help students develop […] in a number of ways." P. 211). **Explicit theoretical background:** Self-directed learning, inquiry (Justice et al. 2002)	
11	**Levin & Koski (1998): Administrative Approaches to Educational Productivity.** **Method:** Conceptual narrative. **Goal:** Establishing an institutional framework of administrative and organizational devices to raise higher education productivity in order to counter raising costs.	**Focus:** Nudging as institutional context and specific interventions that provide external incentive and stimulation for learning ("services" p. 16). **Attitude:** Positive.	**Mind-set:** Bounded Rationality: Need to stir motivation by "building on the interests and goals of the students and, ideally, provide credit." (p. 16); free learning only within a priori fixed boundaries (p. 15-16); Quantitative evaluation of teaching "success" on an institutional level (p. 18). **Explicit theoretical background:** Productivity (Levin 1991); Human capital & Stagnant industry model (Baumol 1967); New Institutional Economics (property rights: Furubotn & Pejovich 1972)	Behavioural.
12	**Marginson (1997): How Free is Academic Freedom?** **Method:** Conceptual narrative. **Goal:** Assessing the boundaries to academic freedom though institutional and managerial restrains ("regulated autonomy" p. 359).	**Focus:** Nudging as indirect political direction ("people […] are caused to behave" p.363). Nudging as use of power (p. 363). **Attitude:** Critical.	**Mind-set:** Nudging through structure as hierarchy and the exercise of power. Consequential behaviour through institutional framing ("modernist systems of economy and control" p. 367) that can be countered by free and collaborative exchange (p.368). **Explicit theoretical background:** Holistic vision of scholarship (Newman 1959), Foucault (1988), Conflicting managerial logics and interests (Gordon 1991).	Constructivist.
13	**Page & Scott-Clayton (2016): Improving college access in the United States: Barriers and policy responses.** **Method:** Literature review.	**Focus:** Nudging as behavioural intervention to facilitate navigation of complexity (p. 10-13)	**Mind-set:** Pursue of higher education as cost-benefit (return on investment) analysis (p. 5, 6-7); need for student-centred intervention to increase learner-institution fit (p. 11).	Behavioural.

	Goal: Describing the barriers to higher education in the US through market imperfections in student aid.	throughout the experience of study (p. 14-16). **Attitude:** Positive.	**Explicit theoretical background:** Human capital theory (Becker 1964), Bounded Rationality (Thaler & Sunstein 2008).	
14	**Peacock & Cowan (2017): Towards online student-directed communities of inquiry.** **Method:** Literature review. **Goal:** Explaining the benefits of online higher education to facilitate higher-level self-directed learning in students.	**Focus:** Nudging as goal-specific boundary setting and design of learning environments. **Attitude:** Positive.	**Mind-set:** Self-directed learning as prerequisite for development of critical and creative thinking abilities but within a priori and hierarchically set frames ("The teaching team determines overall aims and draft framework, while negotiating final details with learners" p. 5; p. 6-9). **Explicit theoretical background:** Competences and human capital theory (Anonymous 1981); self-directed learning (Rogers 1969).	Cognitivist.
15	**Stevens (2015): Role-play and student engagement: reflections from the classroom.** **Method:** Quantitative survey. **Goal:** Investigate student's perceived attitude on the impact of role-playing as active learning strategy.	**Focus:** Nudging as stimulation to engage and motivate students. **Attitude:** Positive.	**Mind-set:** Heterogeneous body of students (p. 481) as a challenge for teaching large introductory courses. Collaborative group-based learning to foster involvement and, thus, enhance learning experience and increases study outcome (p.481-482). **Explicit theoretical background:** Co-creation of knowledge (King 1993, Neary 2010).	Cognitivist.
16	**Thody (1989): University management observed — A method of studying its unique nature?** **Method:** Qualitative structured observation. **Goal:** Explore idiosyncrasies of university management through tracking managers' daily work routines.	**Focus:** Nudging as stakeholder influences setting boundaries to decision making "nudges and pushes" (p. 291). **Attitude:** Critical.	**Mind-set:** Higher education management under conflicting values and complexity (p. 282-284). **Explicit theoretical background:** Hybrid management theory (Campbell 1957), diversity of managerialism (Mintzberg 1973), Garbage Can model (Cohen & March 1974).	Behavioural.
17	**Vlachopoulos & Cowan (2010): Choices of approaches in e-moderation: Conclusions from a grounded theory study.**	**Focus:** Nudging as moderation of students' learning process through	**Mind-set:** Unity of teaching and learning as one practice (p. 223). Positivistic; best practices of higher education teaching can	Cognitivist.

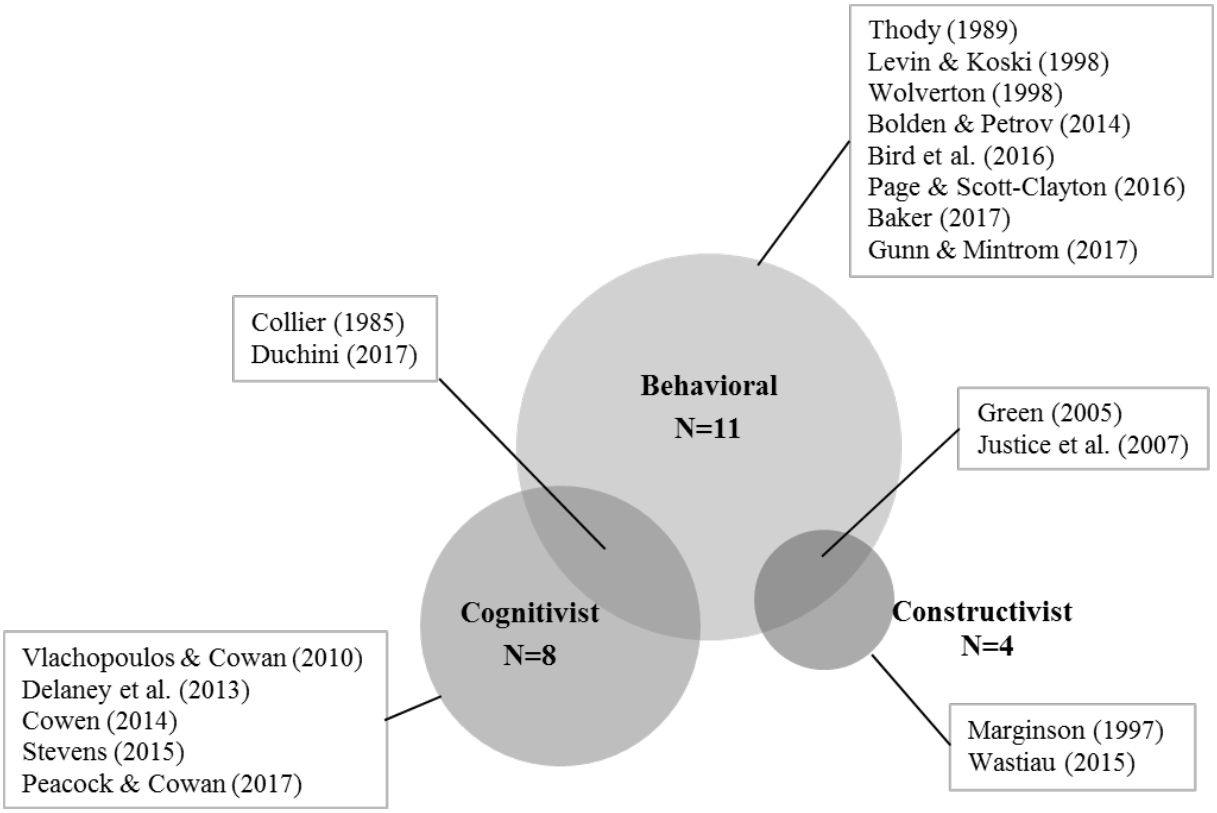
	Method: Grounded theory case study. **Goal:** Identifying the new challenges for the application of teaching principles developed for real-life learning in e-learning.	intervention by tutor (p. 214, 220). **Attitude:** Positive.	and should be developed to foster learning success (p. 222) **Explicit theoretical background:** Bruner (1986)	
18	**Wastiau (2015): What Does Learning Prepare for Today? Co-creating Knowledge for Action.** **Method:** Narrative review. **Goal:** Describing the challenges for teaching and learning to develop essential competences for the post-modern society.	**Focus:** Nudging as behavioural trigger ("[t]o force (or nudge) entirely self-interested individuals to achieve better [outcomes …])", p. 395. **Attitude:** Critical.	**Mind-set:** Behavioural economics, Human Resource Theory (p. 394). Learning as a co-creative network activity to grow a "[p]attern of [k]nowledge" (p.394-395) and "aggregat[e …] billions of individual data, each part of which is worthless in isolation" (p. 395). Knowledge as commons and meta-cognition (p. 395-396). **Explicit theoretical background:** Levine(2007), Ostrom (2010).	Constructivist.
19	**Wolverton (1998): Champions, Agents and Collaborators: leadership keys to successful systemic change.** **Method:** Qualitative case study research. **Goal:** Exploring the role of different leadership styles for organizational progress in higher education.	**Focus:** Nudging as "conspicuous[ly …] coaxing institutional members to move beyond their normal, operational comfort zones" (p. 25). **Attitude:** Positive.	**Mind-set:** Agency & Bounded Rationality, need to frame and address need for external motivation: '"helper[s]", "mover[s]", "doer[s]"' (sic.) (p. 27). Motivational, charismatic, and transformational leadership (p. 26-28). **Explicit theoretical background:** Centrality of leadership for change success (Lewin 1938, Mintzberg 1989, Senge 1990, O'Toole 1995)	Behavioural.

FIGURE 1



Notes: Publication frequency of nudging-themed articles per year for all articles retrieved (9th August 2017). N=19, polynomial trend line.

FIGURE 2



Notes: Paradigm distributions throughout the nudging discourse in international higher education journals. Diameters represent relative frequencies. Based on the paradigm coding of N=19 research articles, multiple classifications possible.