LEARNING BRIEF

#04

What is ‘Nudging’ in Education and How Does it Contribute to Behaviour Change?

EdTech Hub

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Why this question matters

This paper discusses the behaviour change strategy of leveraging concise messages at strategic decision points to influence the behaviour of a recipient towards a desired outcome. This is known within behavioural psychology as a 'nudge'. 'Nudging' is a tactic now used in almost all areas of society. The essential purpose of a nudge is to encourage people to change their behaviour in response to a particular problem. Nudges have been categorised by Weijers, de Koning, and Paas[1] as:

- Type 1: stimulating an automatic, almost innate response
- Type 2: stimulating reflection on a particular behaviour
- Transparent: clear, visible sign of the required action
- Non-transparent: implicit or assumed understanding of the required action.

Within this classification, nudges can be 'type 1-transparent' (e.g., road signs to control traffic), 'type 1-non-transparent' (e.g., reduction in plate size to encourage portion control), 'type 2-transparent' (e.g., images on cigarette packs encouraging people to stop smoking), and 'type 2-non-transparent' (e.g., a multiple-choice question with irrelevant choices stimulating reflection on those choices). Nudging has grown in popularity as a tool within policymaking in recent years, especially in areas such as public health.[2] Indeed, the UK Government has had its own 'nudge unit' since 2010, which informs UK policy by examining how people make decisions and adjusting policy as a result of this. The unit had a significant role in the UK's Covid-19 pandemic response efforts.[3]

In education, nudges have been used to tackle issues such as student attendance,[4] teaching practices,[5, 6, 7] engaging parents and/or caregivers in their children's education,[8, 9] and shifting cultural attitudes to education.[10] The Global Education Evidence Advisory Panel (GEEAP) classified "giving information on the benefits, costs, and quality of education to parents, caregivers, and children," as one of three 'Great Buys' (i.e., a cost-effective educational intervention supported by a strong evidence base).[11] The report notes the conditions in which providing such information can ensure positive outcomes, i.e., "where specific, locally relevant information of decent quality from a trusted source is available. The delivery method of the information (for example, text messages or meetings) must be tailored to the country's specific needs. Also, recipients must have the means to act on the information [...] and communities that receive the information need to have enough access to decision-making structures to spur action."[12]

The GEEAP cites examples such as in Peru, where Innovations for Poverty Action (IPA) and Abdul Latif Jameel Poverty Action Lab (J-PAL) evaluated ways of providing relevant information to help students and their families make more informed decisions about education. They used a series of telenovela-style videos screened as part of the curriculum in schools, as well as an interactive tablet app, and found that the messaging intervention was effective at changing educational plans and lowering student dropout rates.[13] Overall, the report indicates that interventions providing information on education promote good educational outcomes. One of the main ways that such information can be provided is through 'nudging'.

When considering EdTech specifically, nudges often take the form of messages.[14] This brief uses the terms 'messaging' and 'nudging' interchangeably, given this association. Messages can encompass multiple modalities, such as text (e.g., SMS and/or WhatsApp messages, printed materials),[15] audio (e.g., radio, phone calls, or

voice notes),[16, 17] and video (e.g., television).[18] Some of these modalities are unidirectional (e.g., broadcast radio), others are bidirectional (e.g., a phone call), while some can be networked (e.g., messages within a community forum). Since the Covid-19 pandemic, the prevalence of nudge messaging in education has grown as remote learning strategies became a core priority.[19]

This brief focuses on EdTech Hub's work in relation to nudging. It builds on work from messaging interventions in Ghana and Kenya, linking these to broader literature on the topic. In summary, it emphasises that although there is a strong and growing evidence base for nudge technologies, effective implementation remains dependent upon context-specific adaptation. It is not inevitable that nudge messaging interventions will lead to positive outcomes—indeed outcomes are often mixed—and it is therefore vital to understand the specific impacts that interventions have on particular groups of recipients.

Key insights to improve practice

Iterate on evidence-based principles of behavioural design to fit the context through regular user feedback

Nudges can be designed in ways that make them likely to be more or less beneficial. Behavioural psychology principles are useful starting points to inform the effective design of nudges. For example, the MASTER framework, and its associated prompting questions (see Box 1 below), provides some considerations for how to ensure that nudges are appropriately contextualised and targeted.[20]

Box 1. *MASTER framework*

- **Messenger:** Who is the message from? How might the sender's profile increase or decrease the recipients' chances of engaging in the message, and making a change as a result? Should the sender change over time if sending multiple nudges?
- **Attractive:** Is the message likely to promote individuals' intrinsic or extrinsic motivations? Will it be rewarding?
- **Social:** Is the behaviour in line with the socio-cultural norms of a particular community or context? How can people within communities encourage others to follow suit?
- **Timely:** When is the message sent? Is that time likely to mean the message is 1) read, and 2) interacted with? How else does time factor into the nudge (e.g., if communicating a deadline)?
- **Easy:** What is the level of complexity in the message (language, technical skills, digital skills)? What barriers

are in place that may prevent individuals from engaging with the message and then making the intended change?

- **Regular:** Is the message a one-off or part of a series? How does that impact the principles above (e.g., time, messenger)? How can the trade-off between message fatigue and useful reminders be managed effectively? How can reminders transition into the development of a habit?

The above prompts can help designers tailor nudge content in ways that are culturally, linguistically, and socially appropriate. Feedback is critical to this process. Prototypes of nudges should be tested with users (i.e., students, parents, or teachers) to understand their responses to the prompts above. Then, regular feedback during an intervention ensures nudges adapt and are dynamic to evolving contexts. Feedback can be explicit, (i.e., through a survey), or implicit (i.e., tracking click-throughs or numbers of people who opted out of receiving messages).[21] All of this data is useful in understanding the crucial issue of whether nudges continue to be effective over time.

Zhao et al.[22] developed and tested a methodological approach for identifying the specific characteristics of messages that increase attendance in schools in Northern Ghana. They found that there was a significant positive impact on attendance for those parents and caregivers who just received messages at baseline. However, sending reminder and endline messages on top of baseline messages to parents and caregivers did not significantly increase student attendance. These mixed findings could be indicative of message fatigue, where 'nudging' can become 'nagging'. The findings also highlight the broader, structural barriers to school attendance which remained significant, constraining factors during the study, such as:

- students involved in income generation activities and household chores
- families' limited financial resources for purchasing school supplies,
- parents' and caregivers' low literacy levels to engage with the messages.

This demonstrates the importance of continual monitoring and tracking within any nudging intervention. Such monitoring can help indicate whether to continue, adapt, or even stop messaging, and whether to enact these actions wholesale or for specific individuals or groups.

Identify and prioritise individuals close to making a change in their behaviour, or those at a 'tipping point'

Nudging is most effective with individuals who are already at a 'tipping point' of some form in relation to their behaviour. Tipping points include a wide range of social, ecological, technological, political and economic conditions.[23] In relation to school attendance, for example, nudging is most effective if a child is almost ready to go to school or a parent and/or caregiver is just about ready to send their child to school. In practice, this might mean that they already have the necessary practical information (school location, term dates), physical necessities (equipment, stationery, uniform), and means (transport, time). Understanding the relevant tipping point in the specific context, and which individuals might be close to this threshold, is critical to identifying where to target nudges that would have the greatest impact. The identification process itself is complex, and requires a level of investment, but prioritising this is likely to lead to greater levels of behaviour change. An identification process for a nudge-based intervention aiming to improve student attendance could involve:

1. Conducting an in-person home visit or phone call for a targeted sample of out-of-school students

2. Assessing the likelihood of each student attending school from this visit
3. Sending follow-up nudges (phone calls, messages) to individuals who have been identified as closest to making a change.

Although targeting nudges to individuals closest to the tipping point is likely to promote good outcomes, there is also wider evidence that once enough individuals have been impacted by nudges, the tipping point analogy can also be applied to communities, or society as a whole. This is because social desirability around behaviour change—or "norm cascades"—come into effect.[24] This tipping point is very hard to quantify in education, but the wider social science literature suggests this is around 25% of a population. This figure depends on historical and socio-cultural attitudes, norms and biases, and the extent to which these are embedded in communities.[25]

As such, targeting individuals at the tipping point and supporting their behaviour change can result in larger, community-level changes over time.

Reach individuals at the right level, pace, and tone to increase uptake

Aurino, Tsinigo, and Wolf evaluated a digital intervention which aimed to improve parent and caregiver engagement with their children's education and development in rural Ghana during the Covid-19 pandemic.[26] Sixty-five per cent of the parents and caregivers within the intervention group had no formal education and this was found to be a determining factor in interaction with the messages, and, ultimately, whether the messages had a positive impact. The study found that messages had adverse effects on parents and caregivers with less formal education and actually reduced their engagement in education. This aligns with other studies, including Zhao et al.[27] cited above, which have found that nudging can sometimes crowd out intrinsic motivation,[28] or pressurise individuals.

Beam et al. found related equity-related issues in their randomised controlled trial (RCT) in Bangladesh. They tested the impact of SMS nudges on student engagement with online learning and educational TV, and found that students from higher-income households benefited from the intervention to a greater extent.[29] Wolf and Lichand also reported interesting results in relation to equity in their study on nudges to parents and teachers in Côte d'Ivoire.[30] While they found no statistically significant impacts on learning across treatment groups as a whole, there were effects on different sub-groups of students. For example, there were larger learning gains for students with lower baseline test scores, and negative impacts on learning for girls in the treatment arm, where only teachers received messages.

Therefore, understanding the foundational skills (e.g., literacy, digital) of the target population is an essential component of understanding whether a messaging intervention is the most appropriate means of reaching the sample. This enables decisions to be made regarding content type, language, tech modality, accessibility requirements, and level of complexity of the content. A baseline assessment of skills, access, technology use, and needs, is particularly important when working with individuals in low-income contexts, where overall levels of access to, and attitudes towards, technology and education, are likely to be lower.[31]

Madaio et al. provide practical recommendations for how to scaffold the content of nudge messages for parents and caregivers with low literacy levels to support their children's literacy, based on a study in Côte d'Ivoire.[32] These include designing messages that multiple actors within a family unit can interact with—not just the parents or caregivers. This can improve the chances that parents and caregivers with low literacy levels can seek support when needed. In addition, considering the appropriate tech modality is crucial in low-literacy contexts, as a phone call or voice note might be a more appropriate nudge than a text-based message.

These findings show the wide heterogeneity of impact a nudge can have, and the identity of the recipient is a critical factor in this impact. In particular, they highlight the need for equity and contextualisation to be at the forefront of design considerations for effective nudge interventions. The unintended consequence of pushing individuals such as parents and caregivers further away from the education system is a real risk that can have lasting effects within communities.

Use nudges as an entry point for a human connection to be established and leveraged

Nudging has been shown to be most effective when it fills a contextual knowledge or information gap that exists.[33] This could include sharing a message to parents and caregivers on key dates in the school calendar at the start of the year, and then sharing reminders of these key dates throughout the year.[34] In such instances, minimal information is communicated, but the information that is shared is relevant and simple.[35] In addition, this might increase the chances of parents and caregivers attending any in-person events to build human relationships with teachers, school leaders, and other school stakeholders. This human relationship is an important way of sustaining parent and caregiver engagement in their children's education, and nudge messaging can be a catalyst for building this connection and a sense of inclusion and belonging to a community.

In this sense, nudges can be viewed as reminders of one's socio-cultural identity that may have been forgotten or is latent depending on the amount of time individuals might have been excluded, or indeed excluded themselves, from a particular context. The human connection between students and parents and teachers and other school stakeholders can be (re)established by an initial nudge or series of nudges, and could offer hope of more sustained change.

Align immediate, short-term needs and experiences of individuals with long-term educational goals

A nudge is—by its nature—a quick transaction. It is designed to have a short-term impact on behaviour. Education, on the other hand, is longitudinal by nature, with outcomes taking much longer to be realised. This indicates a potential paradox of sorts, and poses an important question as to whether nudging interventions can build towards sustained, lasting changes in human behaviour in education. For example, a nudge may help ensure a teacher uses a particular pedagogical strategy on a given day, but then once this happens, how can the approach adapt to ensure the teacher uses the strategy the next day, and then the next? There can be an overreliance on short-term outcome measures (one-off school attendance) instead of considering longer-term educational goals, which, ultimately, are about learning. Mapping an individual's educational journey in both the short and long term could help create a more coherent picture and inform what a particular nudge is aiming to achieve. Such mapping can help outline the "underlying learning process" that is being targeted.[36] It is vital to establish coherence between the short and the long term, and understand what this means for the overall effectiveness of a nudging intervention. Taking a long-term view with the educational goals in mind, and then working backwards to understand what is critical in the present is needed so that nudges can help respond to both the short- and long-term needs.

Considering both the short and the long term, research in Kenya undertaken in partnership with M-Shule, investigated the effectiveness of low-cost SMS messages to provide personalised learning. It highlighted a particular area for further research around messaging interventions which promote socio-emotional skills—such as building a growth mindset—as a potential method of developing the foundations for recipients to be more mindful to make autonomous

decisions around the intended behaviour change.[37] Similarly, Lichand et al. targeted a nudging intervention on high school students' socio-emotional skills in Brazil and found that messages significantly increased standardised test scores relative to the control group.[38] These examples suggest nudges that target mindset and attitude shifts, such as in these studies, could be a means of effecting change in long-term educational goals more pointedly.

Consider nudging as one factor within an ecosystem of enabling and constraining factors

Nudging is one small enabler within a host of reasons ("choice architecture") dictating whether an individual may or may not make a particular decision or change their behaviour.[39] As such, nudging interventions must be situated within the broader context of ongoing educational interventions, as well as the histories, cultures, politics, and economics of educational environments.[40] Without this broader appreciation of the ecosystem of factors at play, nudges are unlikely to prove effective in catalysing change within the system. For example, participants in Zhao et al.'s[41] study attributed the minimal change in overall attendance to external, societal factors, such as the discontinuation of school feeding programmes, as opposed to whether or not participants received messages, and the types of messages they received. In essence, messaging cannot overcome structural barriers such as limited financial resources, distance from schools, low literacy and digital skills, and other factors which might have persisted in communities for generations.

It is therefore clear, that in order to be effective, a nudge must make sense within its wider educational context. Mapping relevant structural factors is necessary before deciding whether nudges are likely to be an appropriate tactic.

Areas for further exploration

This section poses some outstanding questions that EdTech Hub is still exploring within our work on nudge messaging in education.

How can nudging interventions become more bidirectional?

Nudging tends to be one-way or unidirectional. Broadcasting is a simple way of sharing information. Yet this modality provides no opportunity for interaction, and, as such, makes it almost impossible to assess impact. Though broadcasting is also a low-cost method of transmitting information, low-cost modalities such as WhatsApp now include features such as conversational Artificial Intelligence (AI) bots which can disseminate information and then respond to follow-up questions. Exploring interactive mechanisms on low-cost, yet ubiquitous tech modalities is an important way of building nudge architecture to suit LMIC contexts. Interactivity can also lead to messaging being more learning-focused, opening up remote tutoring and coaching opportunities.

Research on this topic is relatively nascent, though some studies from high-income country contexts have shown promising results regarding the use of AI chatbots to boost student learning.[42] However, with all the affordances AI brings, there are as many risks. Safeguarding and child protection risks are discussed in more detail below. There are also ethical risks around the use of AI

chatbots in education, such as bots that can behave deceptively with their users.[43] The extent to which deception is deemed appropriate within a learning context, in particular with at-risk individuals, is one that needs more attention through research.

Nudge messaging is likely to become more powerful with AI-enabled bidirectional functionality, and there is need for targeted research on how best to navigate the complexities this brings.

What safeguarding considerations should be taken into account when nudging, especially when nudging adults at risk and/or children?

Safeguarding was identified as a notable gap in the literature from Jordan and Mitchell's rapid evidence review on messaging in EdTech.[44] This is a concern given that nudging has been known to increase participants' stress and anxiety during interventions.[45, 46] It is necessary to understand the impact a nudge, or series of nudges, can have, particularly on at-risk groups and when covering sensitive topics (e.g., sexual health and well-being). This links back to the point above regarding the importance of identifying the demographic characteristics of the sample population targeted for any nudge intervention. Where any at-risk individuals are part of the sample, additional support or scaffolding may be required alongside the potentially out-of-context message to support informed consent. There are significant risks here, though, as articulated in a paper regarding nudging in healthcare, where Simkulet argues that nudging is incompatible with genuine informed consent.[47] This is an inherent tension in any nudge intervention where the behaviour change is not aligned fully with the message recipient. Individuals should always have the option to feedback, file a complaint, and even opt out of receiving nudges, and this should be regularly and transparently communicated.

Safeguarding considerations are even more pertinent when nudging or messaging interventions are bidirectional. With the proliferation of AI conversational bots that are increasingly on the other end of messages, Brown and Binder offer the following "questions to consider when assessing the safety of chatbots":[48]

1. Is it clear that the user is interacting with a chatbot and not a real person?
2. Is the option to contact a real person offered at the start of the session?
3. Can the chatbot detect a user in a high-risk situation?
4. Does the chatbot provide empathetic acknowledgement, so the user feels heard?
5. Does the chatbot provide immediate guidance on the topic and/or offer the option of communicating with a real person?

These questions provide useful framing for further research, which could explore safeguarding within nudging in education.

Nudging is low-cost, but is it cost-effective?

In comparison to other EdTech interventions, nudge messaging often incurs minimal costs—especially when using simple, text-based SMS messaging.[49, 50] This means, as Zhao et al.[51] state, "any positive impact on learning outcomes can potentially be exaggerated in a cost-effectiveness analysis." This brief has identified the mixed outcomes of nudges, where sometimes the overall contribution to positive educational outcomes has also included neutral—or even negative—outcomes for certain groups within interventions. Mitchell et al.[52] focus on how to distinguish between what is low-cost and what is cost-effective in a review of messaging (including nudge-based) education interventions in West Africa. They show that while low-cost interventions are often deemed cost-effective, this sometimes obscures the limited, null, or negative impacts that can arise from messaging programmes, particularly for marginalised subgroups. More research is needed

regarding the cost-effectiveness of nudging interventions, placing attributable impact on learning at the centre of this.

How can nudging interventions be more squarely focused on learning?

This brief has described the various uses of nudges and messaging for education in LMICs. Much of the focus has often been on student attendance, or parent and caregiver engagement in education, as this is what most of the literature discusses. However, nudges are increasingly being used as a means to improve learning. For example, nudges are being widely used in gamification within personalised learning apps.[53] Gamification can be as simple as a reminder to complete a daily learning goal to maintain the user's 'streak', to more complex nudges linked to specific skills that a user might want or need to build. Aspects such as being part of a community of learners, league tables to promote competition, and rewards for high levels of participation are all common in personalised learning apps.[54] Understanding the extent to which nudges through gamification can respond to some of the issues presented in this brief (e.g., message fatigue, iterating nudges based on user feedback) would be a valuable addition to this emerging area of practice.

Resources

These resources discuss nudge theory:

- Brescia, Raymond H. 2019. 'On Tipping Points and Nudges: Review of Cass Sunstein's How Change Happens'. SSRN Scholarly Paper. Rochester, NY. https://papers.ssrn.com/abstract=3389471.
- Centola, Damon. 2018. How Behavior Spreads: The Science of Complex Contagions. Princeton Analytical Sociology Series. Princeton; Oxford: Princeton University Press.
- Damgaard, Mette Trier, and Helena Skyt Nielsen. 2018. 'Nudging in Education'. Economics of Education Review 64 (June): 313–42. https://doi.org/10.1016/j.econedurev.2018.03.008.
- Kalil, Ariel, Haoxuan Liu, Susan Mayer, Derek Rury, and Rohen Shah. 2023. 'Nudging or Nagging? Conflicting Effects of Behavioral Tools'. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4318177.
- Lenton, Timothy M., Scarlett Benson, Talia Smith, Theodora Ewer, Victor Lanel, Elizabeth Petykowski, Thomas W. R. Powell, Jesse F. Abrams, Fenna Blomsma, and Simon Sharpe. 2022. 'Operationalising Positive Tipping Points towards Global Sustainability'. Working paper series 2021/01. University of Exeter: Global System Institute. https://www.exeter.ac.uk/media/universityofexeter/globalsystemsinstitute/documents/Lenton_et_al_-_Operationalising_positive_tipping_points.pdf.
- Szaszi, Barnabas, Anna Palinkas, Bence Palfi, Aba Szollosi, and Balazs Aczel. 2018. 'A Systematic Scoping Review of the Choice Architecture Movement: Toward Understanding When and Why Nudges Work'. Journal of Behavioral Decision Making 31 (3): 355–66. https://doi.org/10.1002/bdm.2035.

These resources discuss nudging in education:

- Rahman, Asad, Alice Carter, Catherine Wambûi Kuria, Ciku Mbugua, Lea Simpson, and Nathan Kably. 2022. 'Behaviour Change Key Principles for EdTech | MASTER Framework'. Working Paper. EdTech Hub. https://doi.org/10.53832/edtechhub.0129. Available at https://docs.edtechhub.org/lib/BT283J6U.
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- Weijers, Robert J., Björn B. de Koning, and Fred Paas. 2021. 'Nudging in Education: From Theory towards Guidelines for Successful Implementation'. European Journal of Psychology of Education 36 (3): 883–902. https://doi.org/10.1007/s10212-020-00495-0.

These resources discuss nudging through EdTech specifically:

- Brown, Isabelle Amazon, and Gerda Binder. n.d. 'Safeguarding Girls and Boys: When Chatbots Answer Their Private Questions'. UNICEF Learning Brief: Innovation and Technology for Gender Equality. UNICEF. Accessed 19 February 2024. https://www.unicef.org/eap/media/5376/file.
- Byrne, Jason, Takehiko Ito, and Mariko Furuyabu. 2022. 'Digitally Nudged Learning: A Nudged Gamification Study Intervention'. International Journal of Emerging Technologies in Learning (iJET) 17 (June): 42–60. https://doi.org/10.3991/ijet.v17i12.30567.

- Jordan, Katy, Kalifa Damani, Christina Myers, and Annette Zhao. 2023. 'The Use of SMS and Other Mobile Phone-Based Messaging to Support Education at Scale: A Synthesis of Recent Evidence'. In Proceedings of the Tenth ACM Conference on Learning @ Scale, 282–86. Copenhagen Denmark: ACM. https://doi.org/10.1145/3573051.3596172.
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These resources discuss nudging interventions in low- and middle-income countries:

- Afoakwah, Edmund, Francisco Carballo, Alex Caro, Samantha D'Cunha, Stephanie Dobrowolski, and Alexandra Fallon. 2021. 'Dialling up Learning: Testing the Impact of Delivering Educational Content via Interactive Voice Response to Students and Teachers in Ghana'. Working Paper. EdTech Hub. https://doi.org/10.53832/edtechhub.0051. Available at https://docs.edtechhub.org/lib/P22BR78B.
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Notes

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