RESEARCH DIRECTIONS

Evaluate the benefits of early embedding reflective practice into student experience and personal skill development

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Abstract

Transferable skills are embedded within assessments throughout Higher Education such as organisation, timekeeping and working as part of a team (during groups assessments) amongst some of the skills. Despite this, there is little evidence to suggest that students are fully aware of the importance of reflective practice upon their personal development as a possible transferable skill.

In this study, we aimed to assess if and what students understood by the term ‘reflective practice’, and whether they identify its practice and benefits within their studies and for their potential future careers. Quantitative data, was collected during the first teaching block of the 2021-2022 academic year using specific reflective based questions in a paper-based questionnaire, with results indicating that students who undertook our foundation route, which instilled reflective practice-based assessments were more used to reflective practice than standard degree entry students, and emphasised skill development through reflection; confidence to tackle new task (38%), time management (25%), effective communication (25%) and prioritising tasks (13%). The data also suggested that across all levels of our degrees, students preferred to reflect once feedback of an assessment was received (60%) and after personal tutor meetings (43%), meaning, we as an institution should adapt our practice to develop this further. Embedding reflective practice early in a student’s educational curriculum, could therefore enhance how students approach their course, by providing them with key reflective based skills which they can transfer to their journey within Higher Education and their career.

Introduction

It is well established that a student experience though Higher Education is a journey, not only through their taught specialist subjects and experience of this, but also importantly, one of personal exploration and development. Although key and transferable skills are embedded quite clearly within assessment

throughout undergraduate study, students do not fully grasp the importance of reflective practice upon their personal development (Veine et al., 2019). The ability to question, relate, reason, and imagine solutions are the key premise of reflection (Ryan et al., 2013). It is thought that a number of methods could help in relation to student reflection; this can include pre-assessments which allow students to examine their thoughts, reflective journals to monitor thought processes and integrating reflection into coursework assignments (Tanner et al., 2012, Black et al., 2012). However, many students still struggle to grasp the fundamental aspect of reflection and what it actually means. Historically, a large proportion of research into reflection primarily focused on how educators reflected in their role rather than how students perceived reflection (Cavilla et al., 2017, Bray et al., 2022).

Metacognition as a part of the reflective thought process, comprises both the ability for the student to be aware of their own cognitive processes (metacognitive knowledge) and how to regulate these processes (metacognitive control) (Fleur et al., 2021), however it is important to recognise that metacognition as a branch of reflection, has many layers to the process allowing for a deeper understanding of self-learning for the student (Phillip et al., 2006).

In 2019, our foundation year was moved in-house to the University from its previous venue at Kingston college, in order to allow students to feel integrated within their degree and enhancing course and institutional identity. Bringing the foundation year into Kingston University, created the opportunity to enhance our foundation year in better preparing students undertaking a degree by integrating them as part of the course. A new Problem Based Learning Module (PBLM) known as FX3002 solely designed for students to undertake critical thinking and reflective practice-based assessments, was embedded into the foundation programme for life sciences, focussing on a variety of skill-based assessments such as critical thinking, problem solving and group work, and more importantly the development of reflective appraisal and writing skills. The introduction of reflection at an early stage of a student's degree was primarily with the aim of promoting habitual reflective practice not only during academic study but beyond (Rogers et al., 2001). This was observed by Pretorius (2016) when introducing reflection at an early stage with healthcare students, by the embedding of these reflective skills into entry program level it became the norm, with students continually reflecting throughout their degree (Pretorius et al., 2016). It is often the case that students who enter HE by means of a foundation course, do so because of poor prior achievement in conventional admissions processes, often also manifesting as poor student confidence (Ahmad, R, 2021). Therefore, in particular for a foundation course, it is imperative that focused measures are applied to increase learning skills, confidence building and personal development (Murphy et al., 2009). Introducing reflective practice will allow students to critically analyse their work, help with organisational skills and enhance confidence. (Kimberley et al., 2019).

Aims of the project

In this project we looked at three main themes: Personal reflection, academic reflection and foundation reflection.

The main aims of this project were to:

- Determine where students perceive reflection and how this then helps in their academic progress and personal development as a general transferable skill.

- To compare students who undertook the foundation year at Kingston University versus students who did not take the foundation route, and to assess whether this completing the PBLM module better prepared foundation students to reflect when entering their chosen degree route alongside direct entrant students at level 4 (First year).

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Methods

Project initiation

This project was funded in full as part of the Kingston University pedagogic research SADRAS scheme (Student Academic Development Research Associate Scheme). Recruitment of student partners was achieved though advertisement to undergraduates from years 1, 2 and 3 of courses in the School of Life Sciences, Pharmacy and Chemistry, with information about what the project entailed posted on our Virtual Learning Environment (VLE), Canvas. We initially recruited five student partners to work alongside staff partners, but one student did not engage and so was not included in the final project. The students recruited comprised a first-year Biomedical scientist, two second year Biomedical scientists and one final year Biochemist. This project was student led and academic guided, with questions for the questionnaire designed by both students and academics collaboratively.

Submission of ethical approval

All project paperwork obtained full ethical approval from the Kingston University CHERP (Centre for Higher Education Research & Practice) before the project commenced.

Questionnaire implementation

The paper-based questionnaire was designed and prepared as part of a collaborative effort between student and staff partners. Questions were based on the Likert scale, order of importance scales or yes/no answers with opportunity for further comment, The questionnaire was divided into three main sections, section A: which recorded key student demographics, section B, which Explored student understanding and use of reflective practice and finally section C aimed only toward students who took the foundation route at Kingston university and focused on the PBLM.

Section A, questions included: Gender, age, ethnicity, course of study, qualification on entry, current level, disability, and if yes, type of disability. For section B the type of questions included: understanding of reflective practice, examples of reflective practice, reflection and academic performance, reflection and personal experience, reflection and implementation in your course, when you should reflect, when reflection has helped, identification of career path after graduation, and finally personal reflection. Section C, focused on PBLM and the types of questions included: how important do you rate reflective practice in PBML? did your experience in PBLM help you identify the opportunity for reflection in other modules during levels 4/5? Do you feel that your taught modules now offer you the same opportunity for guided reflection when compared to PBLM? Through your experience on PBLM, which of the following reflection-based skills has been the most helpful to you during level 4/5? The questionnaire also had opportunities for free text in section B and section C.

Questionnaire dissemination

The dissemination of the questionnaire primarily focused on core modules at every year of the degree courses in the school of Life science, Pharmacy and Chemistry, which included: Biomedical Science, Biochemistry, Biological Science, Pharmacology, Forensic Science and Nutrition. The student partners arranged a schedule, contacted the academic in charge of the timetabled lecture, disseminated the questionnaires, obtained signed consent and collected back the completed questionnaires during the halfway break. In the School of Life Sciences, Pharmacy & Chemistry, we have access to large numbers of students (year one ~300 students), (year 2 ~200 students) (year 3 ~180 students). The core modules chosen were: Biochemical Foundations of Life at level 4 (First year), Molecular Biology of the Cell, and Proteins and Metabolism at level 5 (Second year) and finally: Clinical Chemistry and Haematology at level 6 (Third year). The reason these modules were specifically chosen was because that all courses in the school of life science fed into these modules and sampling any others would simply be targeting the same students again. It was stressed to all participants that completion of the questionnaire was optional.

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Preparation and analysis of data

Relevant question data from completed questionnaires were entered into an anonymised and secure excel spreadsheet with only access granted to staff and student partners. The spreadsheet allowed analysis of reflection findings to be examined in more detail and to perform cross comparison with different demographics such as gender, age, ethnicity, course of study, qualification on entry, current level and disability as mentioned previously. This also allowed percentages to be determined for the different questions and tables to be formulated. For qualitative analysis, comments from the questionnaire were analysed using thematic analysis and word cloud-based software (Monkeylearn).

Small group interviews

Any students who indicated during completion of the questionnaire that they wanted to take part in small group interviews was noted and their Kingston University ID number and email address were added to an excel sheet. The small group interviews were to provide qualitative data alongside the quantitative data obtained. A set amount of questions for use within the small group interviews was prepared by the student and staff partners and clearance was obtained from Kingston University ethics. All small group interviews were hosted either online on Microsoft Teams, or in person and recorded for thematic analysis. Recordings were deleted once all interview responses were collated.

Results

Questionnaire Dispersal and collation

The paper-based questionnaire prepared by the student and staff partners was handed to over 300 students within the school of life sciences, pharmacy and chemistry across all levels (Year 1, Year 2 and Year 3) 60 of these were completed in full with signed consent forms. This was implemented over the whole of teaching block 1 (October-December 2022).

Demographics of student responses

The majority of respondents were found to be 18-21 years old (70%), with 73% found to be female. Ethnicity demographs show broad diversity, with 37% identifying as Asian/Asian British, 23% white, 22% Black/Black British, 12% identified as Other, and 5% mixed (Table 1).

Entry Qualifications at University and current course level

The majority of student participants had entered Kingston University with A-Levels (48%), followed by BTEC (20%). 15% of responders had entered Kingston University undergraduate programme from the foundation year and this relates to those who completed section C of the questionnaire. Academic year of study was quite evenly spread between level 5 (second year) of their degree (42%) and level 6 (third year) of their degree (52%), with 7% of responders being from level 4 (First year of their degree) (Table 2).

Reflection based questions – Open to all respondents.

Basic reflection

Our initial aim was to determine if students understood the term ‘reflection’, in response to the question, ‘Do you understand the term reflective practice? Surprisingly 45% said no, suggesting that many students did not reflect or understand the term reflective practice. When students were asked how often they reflected on academic performance and to rate this out of 0-10 (0 being not at all and 10 being all the time), the vast majority reflected frequently (63% reflected 5-7 out of 10), suggesting that those who did reflect, did so on a regular basis (Table 2) (note: this number did not include those students who mentioned they did not understand reflective practice).

Reflective practice and how integrated reflection is in their course.

The next part of the project was to assess how students understood examples of reflection and where they would like to see more reflection integrated into their course.

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Age			
18-21 Years	**22-25 Years**	**26≥ Years**	**PNTS**
42 (70%)	12 (20%)	5 (8%)	1 (2%)
Gender		***Course***	
Male	**Female**	**Biomedical Science**	**Other**
16 (27%)	44 (73%)	46 (77%)	14 (23%)

Ethnicity					
White	**Black/Black British**	**Asian/Asian British**	**Mixed**	**Other**	**PNTS**
14 (23%)	13 (22%)	22 (36%)	3 (5%)	7 (12%)	1 (2%)

Table 1 Demographic characteristics of life science, pharmacy and chemistry students completing questionnaires, expressed as numbers and a percentage of total (%).

Entry qualification to university[1]					
A-Levels	**BTEC**	**Foundation at Kingston University**	**Foundation Other**	**International Baccalaureate**	**Other**
31 (48%)	13 (20%)	10 (15%)	0 (0%)	2 (3%)	9 (14%)

Level of course		
Level 4 (Year 1)	**Level 5 (Year 2)**	**Level 6 (Year 3)**
4 (7%)	25 (41%)	31 (52%)

Do you understand the term reflective practice?[2]		*How much do you feel you reflect on your academic performance (Out of 10)?*		
Yes	**No**	**0-4**	**5-7**	**8-10**
32 (55%)	26 (45%)	9 (15%)	38 (63%)	13 (22%)

Table 2 Demographic characteristics of student's entry qualifications, level currently at in course and basic reflective practice questions, expressed as numbers and a percentage of total (%)[1]Note: Some participants may have more than one entry qualification[2]. Two participants did not state answer to the term reflective practice.

When asked what they thought examples of reflective practice was with a number of choices, the majority chose 'learning from past experiences (53%), followed by being honest with yourself (17%), both of which are fundamental traits in a student's course experience. When asked where exactly reflection should be embedded into their course, students chose assessment and feedback (30%), personal tutor meetings (20%), and finally modules (17%) as the three main areas (Image 1).

Reflection – when is best to reflect and how useful is reflection.

A key aspect of reflection is trying to assess when students should reflect based on personal experience. By asking the question 'When do you think it is most important to reflect in your studies?' This generated a range of popular answers including 'after every lecture session' (27%), 'the start of the academic year (25%), 'preparing for each assignment' (24%) and finally, 'preparing for exams'

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Which of the following do you think is part of reflective practice?[1]	
Learning from past experience	28 (53%)
Being honest with yourself	9 (17%)
Understanding of the situation	5 (9%)
Applying knowledge to problem solving	5 (9%)
Setting personal targets and standards	3 (6%)
Remembering detail	2 (4%)
Consider personal strengths and weaknesses	1 (2%)

If more reflection was incorporated into your course, where would you most like to see this?	
Assessment and feedback	18 (30%)
Personal Tutor Meetings	12 (20%)
Modules	10 (17%)
Course	9 (15%)
Workshops/Practicals	8 (13%)
Group work with your peers	3 (5%)

Image 1 Heat maps to illustrate responses to general reflective practice questions from section B. Colours are represented by green to red with green representing high response (50-100%, orange medium response (20-49%), and red indicating very low response (below 20%) to the question asked.[1] 7 students did not answer question.

When do you think it is most important to reflect in your studies?[1]	
After every lecture session	16 (27%)
Start of the academic year	15 (25%)
Preparing for each assignment	14 (23%)
Preparing for exams	11 (18%)
During enrichment weeks	7 (12%)
After receiving your end of year results	1 (2%)
After every practical laboratory session	1 (2%)

Has reflection helped you in[2]		
	Yes	No
Improving your academic performance	57 (95%)	3 (5%)
Building your confidence	46 (82%)	10 (18%)
Overcoming challenges	50 (86%)	8 (14%)
Taking responsibility for your studies	52 (90%)	6 (10%)
Successfully managing your employment	40 (69%)	18 (31%)
Making career choices	36 (63%)	21 (37%)

Image 2 Heat maps to illustrate responses to general reflective practice questions from section B. Colours are represented by green to red with green representing high response (50-100%, orange medium response (20-49%), and red indicating very low response (below 20%) to the question asked.[1], Variation in number of student responses due to multiple options available[2].

(18%). The spread of answers and similarity in responses, suggests that students who do reflect, may choose to do so at multiple points in the academic year rather than one single point, allowing a deeper reflection and subsequent benefit from doing so.

Asking respondents how reflection helped them in a number of personal traits also provided some intriguing responses, in all categories, students responded yes with a clear majority; with improving academic performance (95%) found to be the highest and making career choices (63%) the lowest, suggesting again that those that do reflect acknowledge that reflection can help with not only academic performance but within the wider context of personal and future aspiration development.

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Kingston University and foundation students – PBLM and reflection

For section C of the questionnaire, this was targeted at only students who undertook the foundation year at Kingston university and more specifically the PBLM. The question 'How important do you rate the reflective practice experience in the PBLM (Out of 10)'?, was answered with 6-10 out of 10 by the majority of students (64%), suggesting they found the reflective practice within the module excellent. When following up with a question comparing current modules and levels of reflection in comparison to the PBLM, students had a 50% / 50% spilt between yes and no, suggesting that either they were not entirely sure if their current modules in levels 4-6 offered comparable opportunities for reflection or that they felt that their current modules did not deviate much in terms of reflection. The final question aimed to understand if what was learned on the PBLM in terms of reflection could have been applied by the students themselves to their level 4/5 modules, and confidence to tackle new tasks for the first time scored a respectable (30%) suggesting that the reflective practice learned during the PBLM, for some students helped build confidence and self-esteem (Image 3).

Qualitative data on reflection

Students who took part in small group interviews were asked several questions with two key questions which we have collated responses for:

- Upon reflecting during your course what have you realised?
- How do you reflect on your mistakes, academically speaking?

How important do you rate the reflective practice experience in PBLM (Out of 10)?	
Mediocre (0-5)	5 (36%)
Excellent (6-10)	9 (64%)

Do you feel that your taught modules now offer you the same opportunity for guided reflection when compared to PBLM?	
Yes	6 (50%)
No	6 (50%)

Through your experience on PBLM, which of the following reflection-based skills has been the most helpful to you during level 4/5?	
Confidence to tackle new tasks for the first time?	18 (30%)
Develop the ability to manage time effectively?	12 (20%)
Confidence to Identify priorities?	10 (17%)
Effectiveness at communication?	(15%)
Confidence to work as part of a team?	8 (13%)

Image 3 Heat maps to illustrate responses to general reflective practice questions from section B. Colours are represented by green to red with green representing high response (50-100%, orange medium response (20-49%), and red indicating very low response (below 20%) to the question asked.

Addressing the first question 'Upon reflecting during your course what have you realised? ' it seems upon reflection a number of students have actually decided the current career path that they chose is not actually what they want with such comments as 'I went into my course wanting to enter dentistry But, upon reflection I've now changed my mind and want to pursue a career in science research'. Another interesting take was on students reflecting upon their current age and opportunities with the comment 'I realised that I won't be able to travel much when I am older, therefore upon reflection I decided that I want to enjoy new experiences while I'm young and healthy', which is intriguing and suggests that maybe embedding some reflective sessions early on in secondary school or 6th form may change the mindset of many students who may choose a different career path or even a gap year before undertaking higher education.

The other question which was interesting from the small group interview responses was 'How do you reflect on your mistakes, academically speaking? this provided contrasting viewpoints which further

enhanced the notion that not every student would reflect in the same manner, thus making the process much more personalised. The first response was in a more moving forward manner ' I try to forget about the bad instances and move forward, I don't want to dwell on something that has already passed', while in contradiction, one student suggested dwelling on past experiences ''I like to immerse myself in the past, relive the challenges, see where I went wrong and correct my mistakes in the present'. This shows that there is not a one size fits all when it comes to reflective practices, and providing the framework on how to reflect only gives a framework, while students can tailor their reflection to what suits them personally (Table 3). Summarising the qualitative data obtained during the project, a word map was produced to emphasise some of the key themes students mentioned with regards to reflective practice (Image 4).

Discussion

Project findings

Reflection is an important trait not only for students but also for career professionals by promoting self-awareness (Fontaine, *et al* 2018). The key findings to arise from this project was undoubtedly that students who were exposed to reflection-based problems early on in their degree course (Foundation) are more likely to continue to use these reflective methods throughout their course, having established a good reflective habit or practice. It is thought that implementing reflection can be on a personal scale or as part of a team with equal success (**Veine *et al*, 2019**). What was also concerning from this study was the high number of students who did not understand the term reflective practice at almost half of those surveyed (44.83%), the lack of knowledge of reflective practice or reflection as a whole is something that needs to change, and this can start as early as primary school, with the importance of this now being investigated (Kulevičienė 2022).

Small group interview question	Illustrative comments
Upon reflecting during your course what have you realised?	'I went into my course wanting to enter dentistry But, upon reflection I've now changed my mind and want to pursue a career in science research'. 'I realised that I won't be able to travel much when I am older, therefore upon reflection I decided that I want to enjoy new experiences while I'm young and healthy'. 'I initially thought that I would like to work in an NHS laboratory but upon reflection, I consider that a research environment would suit my interests more'.
How do you reflect on your mistakes, academically speaking?	'I try to forget about the bad instances and move forward, I don't want to dwell on something that has already passed'. 'I like to immerse myself in the past, relive the challenges, see where I went wrong and correct my mistakes in the present'.

Table 3 Illustrative comments from small group interviews.

Personal reflection

It is termed the method of knowledge acquisition; therefore, critical reflection is a useful skill to develop as a whole (Paterson et al 2013). The first question 'Do you understand the term reflective practice? 26 from a total of 58 students answered No (45%), despite this seemingly high percentage of students answering that they don't understand reflective practice, taking the numbers into context, we must remember that the total students completing the survey was quite small (n=60), therefore this represents ~12% of the department of Biomolecular Science (~500 students) so the issue here is that

the missing respondents could change the numbers quite considerably. Asking the question 'Which of the following do you think is part of reflective practice? Also brought up quite a few interesting observations, 53% mentioned that they reflect on past experiences, 17% of students reflect by being honest with themselves, 9% reflect by understanding of the situation and 9% reflect by applying knowledge to problem solving. These are all key personal traits that could be adapted to real life situations and scenarios and ideally develop a platform where reflection encompasses all aspects indicated above.

Image 4 Word cloud summarising the key themes from the small group interviews and free text comments. Please note FX3002 stands for the PBLM that we mentioned previously (Students know the module by the code shown, hence the response being quite high).

Academic reflection

Academic reflection, in part can be seen as the most important type of all reflections for students as it involves actual reflection on course related material and student achievement and progression. In terms of reflecting on academic performance, 22% of students deem that they reflect excellently (8-10 out of 10), which may relate to almost the same number of students which have taken the foundation route (15%), oddly enough, 63% of students rate their reflection on academic performance as average (5-7 out of 10), suggesting the vast majority feel they can reflect better on their own work then for example reflecting on a peers work. In terms of 'if more academic reflection was incorporated into their course', 30% of students would prefer to reflect on assessment and feedback, 20% within personal tutor meetings, 17% within their modules and 15% within their actual course. Reflection during personal tutor meetings is an interesting point, as this has begun to be implemented at Kingston university and is currently integrated by means of a personal development portfolio at level 4 (Year 1), which will soon be scaffolded to level 5 and level 6. These reflective tasks are also termed design thinking and would allow students to reflect on their work as a whole as well as their course.

Another interesting observation from the data is the notion that students believe that they should reflect after every lecture session (27%), this would be a very useful trait that academics could implement by having 15 minutes downtime session at the end of each lecture, by providing a task for students to reflect on what they learned in the lecture and how this could be taken forward. Students also stating that the start of the academic year is important for reflection, is also an important point in a student's reflective journey, as potentially students could pre-prepare for the whole year by checking all relevant topics for the upcoming teaching block, prepare an organized schedule and reflect on the previous academic year and how they could improve. This could be of particular importance at Kingston University as within our module-based course structure, many modules are preparative for the following academic year. Other responses such as preparing for each assignment (23%) and preparing for exams (18%) should be a common theme for all students. From the initial findings of this study, reflection has since been embedded into all assessments of our four specialist MSc Biomedical Sciences courses; two haematology and two medical microbiology modules. This has

proven to be very insightful for students, and also for academic staff in determining the clarity of assessment instructions provided to students and finally providing a better understanding of where and how students seek additional help. The final question in which students were asked what reflection has helped them with including academic performance (95%), confidence building (82%), overcoming challenges (86%), taking responsibility for their studies (90%), managing employment (69%) and making career choices (63%) show a number of transferable skills such as confidence, responsibility, determination and management that would be advantageous for any student to possess, and actually completing the questionnaire in some way has highlighted to students the importance of reflecting on their studies and career. This was further supported by the qualitative comments received.

Foundation reflection

The final set of findings found exclusively with those students that completed the last section (Only open to Kingston University foundation students). The result from this section reinforces the notion that introducing reflective practice early allows students to reflect well throughout their degree. For the question 'How important do you rate the reflective practice experience in FX3002 (Out of 10), 64% rated this excellent, suggesting that they were satisfied with the amount of reflection offered in this module. Of note, students are exposed to a range of academics with different styles and methods of reflection which helps students to tailor their own personal reflection from this exposure. Interestingly, only 50% of students agreed that their current modules offered the same amount of reflection as the PBLM, suggesting that we don't offer enough reflective practice in our life science, pharmacy and chemistry degrees to date.

Every reflective journey is tailored to the student and students must forge their own path when it comes to reflection, but what is clear is that more reflection is required in our programmes. The university is leading several initiatives in developing key and future skills, but at present, with no direct emphasis on reflection and reflective practice. Skill development is of course extremely important, but perhaps more so, the realisation of the individual that they have developed these skills.

How can this study be taken forward?

The study presented, has assessed in detail various levels of reflection and reflective practice at Kingston University, and the key outcome from all this is that reflection and reflective practice are important skills which should be embedded across all degree programmes. The benefits of reflection are profound, with increased confidence, organisation, time management, prioritising, communication and working as part of a team. What Is also obvious from this is that reflection is a lifelong trait, once learned, that can be adapted not only academically but personally and professionally. The easiest way to implement this would be to embed this in the current personal tutor scheme at Kingston university, by way of weighted tasks, similar to what is seen in the current foundation programme, but what is also quite clear, is that once students reflect, then it can drastically change their career trajectory and choices, therefore it should be strongly considered to introduce this very early on, even considering at primary school level to allow students to reflect on a lifelong journey, enhancing students thought processes from a young age and may help with decision making and course selection.

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