Real time learning logs in General Practice: Tracking in consultation learning of general practice registrars

Executive Summary

The key motivation for this research was the knowledge gap about the utility of learning plans identified from the 2018/2019 Special Education Research Grant (ERG) on workplace-based assessment (WBA), led by GPEx. The WBA research highlighted concerns from registrars, supervisors, medical educators and RTOs themselves around whether the current learning plans were actually assessments and the desire for a way of assessing real-time learning and the ability to self-reflect. Motivation for reflective practice is linked to issues of safety, being a 'good' doctor, respect for patients, using evidence-based guidelines, learning how to deal with uncertainty, and a commitment to life-long learning. These aspects need to be incorporated into registrar training. This project aimed to better understand how Australian general practice (GP) registrars learn within the consultation and how logging their learning concerns in real-time might allow for a better reflection of their educational needs than the current learning plans. Our research aims were to explore:

- How Australian general practice registrars learn within the consultation
- The acceptability, feasibility and utility of a learning checklist tool for registrars
- How real-time mapping of their learning concerns allows for a more accurate reflection of their educational needs.

As part of the project the acceptability, feasibility and utility of a learning check-list application was piloted with registrars. The project built on existing research around learning plans and their low utility, by interviewing registrars about their in-consultation learning and how they reflect on their educational needs. Eighteen registrars enrolled, 15 registrars in South Australia and three registrars in the Northern Territory. An original interview explored how registrars usually learnt within a consultation and the tools they used to assist with this learning, how they communicated with their supervisor and how they thought learning with the consultation could be improved. The registrar was then given access to the Learning Logs tool as a phone app and web tool. A second interview approximately two weeks later asked about how useful the Learning Logs tool had been, whether they shared their logs with their supervisor, any improvements they might suggest, and how they would envisage the learning logs of the future. Through the analysis of the transcripts, the registrars' mindset (fixed or growth) towards learning was explored using a coding sheet. Thematic analysis if interviews resulted in a number of themes.

A key theme was that registrars all learn from clinical consultations differently and have different reminder methods, aide memoirs, collation of study notes etc. Some use loose paper, some notebooks, some phone apps and some computer or web-based applications. Some need more structure to their learning plans, and some prefer to be more flexible. Some learn better in a group, and others by themselves. While the concept of the app and web based learning log tool was found useful by some, with articulated benefits, it is clear that such a tool will not meet all registrars' needs. Any approach to documenting and assessing reflective practice needs to be flexible to cater for this diversity.

Another theme indicated that the quality of reflective practice seems to be linked with a 'growth mind-set'. Registrars who have a passion for learning and see gaps in knowledge as a challenge in order to improve, will find a way of logging and monitoring their own learning on a long-term basis. It is the registrars with a 'fixed mind-set', who are only studying to pass their exams, and see gaps and mistakes as a failure who need to be targeted to ensure they too Fellow as life-long learners. They can be guided to learn how to change their 'mind-set' by learning skills that can be trained and

assessed. This is not an all-or-nothing concept, but a spectrum, making it beneficial for most registrars. This will encourage doctors to continue to reflect and learn after they have passed their exams.

The key messages from this research have several important implications for GP training. The main aim of mandatory learning plans is to ascertain whether a registrar can demonstrate the skills required to be a self-reflective life-long learner. However, drafting forced learning goals does not seem to be an appropriate method to assess whether they have these skills. In most RTOs structured learning plans need to be submitted at pre-ordained times and are seen as artificial, bureaucratic and unhelpful. From the perspective of the RACGP, there is a need to ascertain a more flexible method for assessing that registrars are developing the skills that might be needed.

Registrars will be more engaged with learning plans if they are user-controlled regarding ways of logging learning needs, how to prioritise, who to ask for assistance, how to sign off as completed etc. 'Logging' learning by documenting it and signing it off themselves, or optionally with a supervisor or Medical educator (ME), can increase personal commitment to learning for some. Learning needs to be done *with* the registrars, not *to* the registrars. Self-regulation and self-reflection cannot be forced. Learning is also more successful if it's directly relevant to everyday practice and an action plan for learning is linked to issues about patient care and practice issues. This is best done in real-time and not prospectively or retrospectively.

An optional electronic learning log available on both the web and as an app may be a useful tool. Further development needs to address the issues identified by the participants. Any technological tool needs to add value to what the registrar is already doing, otherwise it will just be seen as a burden. Registrars are likely to expect that technology will make their learning simpler, with less uncertainty and effort. However learning will always be complex, and as with GP, filled with uncertainties, and so effort is required to learn.

How registrars learn, and the external structure, tools and input they need, changes over the course of their training. Conversely, previous research has shown that sometimes registrars are actually more confident in their first semester as they are 'unconsciously incompetent' and 'don't know what they don't know'. Ensuring that GPT1 registrars have access to training, structures, time-lines and feedback to guide self-reflective learning will be of assistance.

Supervisors are potent role models for registrars in how to learn on the job, how to have a growth mindset, and the importance of life-long learning. They should understand the importance of this role in their relationship with the registrars. There also needs to be flexibility to enable different learning approaches to interact, while still achieving consistency, so that learning goals can be monitored by the registrar, supervisor and medical educator in order to achieve a coordinated and efficient approach to learning.

In sum, to equip registrars with sustainable skills and attitudes towards life-long learning, a different approach is recommended. Firstly, a range of strategies and techniques for managing reflection and learning should be introduced during GP training to enable registrars to find which strategy aligns with their learning style and needs. In addition, there should be an increased focus on developing and encouraging growth mindset, which may better fuel a positive attitude of life-long learning.

Report

Background and Literature review

The key motivation for this research was the knowledge gap about the utility of learning plans identified from the 2018/2019 Special Education Research Grant (ERG) on workplace-based assessment (WBA), led by GPEx. The WBA research highlighted concerns from registrars, supervisors, medical educators and RTOs themselves around whether the current learning plans were actually assessments and the desire for a way of assessing real-time learning and the ability to self-reflect (GPEx 2019). One of the aims of WBAs is to assess the progression of a registrar towards being a safe and independent life-long learner (GPEx 2019). Hojat (2009) defines life-long learning as 'an attribute involving a set of self-initiated activities and information-seeking skills with sustained motivation to learn and the ability to recognize one's own learning needs'. Thus, learning plans should be based on gaps and learning needs, and not be an assessment of performance (Wolcott 2020). In the hands of some registrars, supervisors and medical educators, learning plans are fulfilling this role, others think they are an administrative tool to document gaps, and still others see them as merely a 'tick-box'. This highlights that it is the relationship between the user, the system and the tool that determines a tool's functionality and benefit.

While undertaking stream 2 of the WBA ERG, which examined the WBA tools in use across the regional training organisations (RTOs), it became evident that there was a large variety of ways in which learning plans were implemented and utilised within each RTO. Initially, only three of the nine RTOs surveyed reported learning plans as a workplace-based assessment, despite learning plans being an RACGP requirement. When RTOs were re-contacted to ask whether they undertook learning plans, all but one RTO said they did, but didn't feel they were a WBA and saw the plan more as a tick-box exercise with low educational yield. It was evident that the plans may exist, but their value was negligible. As part of stream 3b of the WBA ERG, learning plans were discussed in the interviews and focus groups with 127 registrars, medical educators or supervisors. The negative opinion and utility, and low perceived value were further evident, and some novel concepts as to how some registrars learn in the consultation emerged. These included app-based checklists linked with supervisors and mock patient files which would be given additional diseases and symptoms based on real-life patient presentations (GPEx 2019).

As adult learners, it is expected that registrars should be self-motivated, strategic, reflective, and have skills to evaluate their own learning needs and outcomes. Self-regulation is an integral part of this, with the implementation of the cycle of 'Set a goal, develop an action plan, act, monitor, evaluate, change what not's working or do more of what is working…and then continuing with this cycle until success is reached' (Roberts 2008). In order to ensure

that this is occurring the RACGP has implemented learning plans as a mandatory formative assessment. The acceptability and feasibility of mandated learning plans has been explored in previous ERGs, most recently in 2015. The learning plans were deemed bureaucratic and as a result consensus was reached that learning in the consultation needed to be dynamic, taking into account the learner and the environment. (Garth 2016)

Reflective practice is seen as an important outcome of medical education, with experiential encounters being vital in order to consolidate episodic memory and subsequent learning (Sandars 2009). Planned learning may still be a central concept, but it needs to be timely, outcome-based and achievable. With this in mind, it is evident that current learning plans in Australian general practice training fail to sufficiently address the needs of the registrar if they are not specific and do not have a reflective component (Brown 2015). However, the perceived utility of prospective learning plans with mandatory SMART goals documented and signed off in an online learning platform at predesignated times and occasions is low as well (GPEx 2019). Somehow, the intention of such learning plans as an assessment of the registrar's ability to self-reflect, ensure continuity of learning, and strategically plan learning seem to be lost in the bureaucratic burden they seem to engender (Garth 2016).

In the scope of life-long learning it is important that general practice registrars find ways to identify their learning gaps and develop goals and methods of tracking their learning needs and outcomes, with the idea that any assessment should have an attached 'action plan' (Challis 2000). The processes for the documentation, 'sign-off' and accountability for this action plan depends on many factors and, if part of a formative or summative assessment, will be determined by the training body involved.

For many registrars, developing personal learning goals and action plans from assessments comes easily, and their usual approach to learning will continue into the future as self-reflective life-long learners. However, completely self-directed learning is too user-dependent and may result in poor engagement for those who need more structure and accountability in order to stay motivated to self-reflect and learn. Linking learning needs and assessments to learning outcomes will need guidance for some registrars and mandated learning plans need to reflect the myriad of contexts, learning approaches, stages of learning, personalities etc in GP registrars. Sy et al (2014), undertook a retrospective analysis of learning logs, looking at learning behaviours of Ontario family medicine residents, concluding 'A successful academic program must take into account residents' various learning preferences and habits while providing guidance and training in the use of more effective learning methods and resources to maximize educational outcomes'.

The context a registrar finds themselves in will also influence how their learning approach develops (Van Deventer 2005). As well as the environment and clientele in the practice, the supervisor as a role model can have a great influence on the registrar's growth as a GP

(Pront 2009). A supervisor who themselves is a self-motivated learner keen to identify their own deficits, and learn from the registrar themselves, will be a very different role model than the more didactic supervisor who does not admit to having any doubts or gaps in their knowledge. Supervisors play a key role in helping registrars plan their learning, however, 'for supervisors and trainees to achieve the educational potential of their supervisory encounters they require flexibility' (Brown 2018). Post-fellowship, GPs continue to need to be reflective learners to ensure they maintain best practice care for their patients. The use of learning logs as part of continuing professional development has been explored in the UK, allowing for various approaches to learning with the common theme of reflection (Howard 2019).

In the post-Fellowship space, the RACGP thought a great deal about reflective practice when they developed the PLAN activity for CPD was developed. The aim of this activity was to replace the optional 'learning needs assessment tool' previously used. Its development acknowledged the fact that learning plans are required by many health professional boards and colleges in Australia and internationally. The RACGP's reasoning was that reflective learning abilities are 'complex, can be developed, and appear to be linked to deeper levels of learning and development of professional identity', further leading to the desired aims of 'self-regulated learning and the development of professional identity' (RACGP 2017). It seems that an assessment of this deeper reflection, anticipation of challenges, and development of professional identity was the aim of PLAN and also of the learning plans mandated for GP registrars. However as mandated activities, both seem to have missed this mark (Brown 2015, Lambert 2018). Nevertheless, consideration should be given to re-exploring reflective learning approaches for General Practitioners post-Fellowship.

Carol Dweck has developed and researched a theory of fixed and growth mindsets in tandem with current research on adult learning theory and brain plasticity (mindsetworks.com/science). The idea is not new that a 'growth mindset' involving self-reflection, effort and seeking out challenges leads to success, for instance there is an established literature on the use of self-reflective learning portfolios as an important element in formative assessment (Snadden 1998, Driessen 2005). Intrinsic motivation without an external reward to learn from mistakes, discovery of gaps in knowledge, and feedback from others, will foster a sense of purpose and meaning (Dweck 2017, Ng 2018). Similarly seeking out role models, engagement with complexity and learning from failure are important features that educators would like to encourage in GP registrars (Babenko 2019). On the other hand, a 'fixed mindset' has also been correlated with 'avoidance behaviour' and psychological distress (Babenko 2019). For many registrars there is a tension between the development of a growth mindset as above, rather than a fixed mindset where looking for personal validation, avoiding negative feedback, and only memorising what is necessary, take precedence.

There is no medical education literature on the use of electronic real-time learning logs with in-built reflective capabilities. An online CPD app has been used by the Royal College of Physicians in the UK which records CPD activity as well as an online diary, but this has not yet been evaluated (https://www.rcplondon.ac.uk/news/new-physicians-cpd-app-will-help-doctors-record-learning-go). Along with exploring how registrars reflected, identified gaps, and planned for learning, this current study sought to develop and evaluate a real-time app-based programme with learning goals, reflection, prioritisation, reminders and evidence of completion, which can be linked to a supervisor and signed off. It was hoped that this might allow for a more authentic learning plan system to be proposed that might replace the current system of mandated learning plans.

Objectives

This project aimed to better understand how Australian general practice registrars learn within the consultation and how logging their learning concerns in real-time might allow for a better reflection of their educational needs than the current learning plans. As part of the project the acceptability, feasibility and utility of a learning check-list mobile application was piloted with registrars. The project built on existing research around learning plans and their low utility, by interviewing registrars about their in-consultation learning and how they reflect on their educational needs.

Our original research questions were:
- Does tracking learning needs within general practice registrar consultations adequately capture learning deficiencies?
- Is the concept of real-time application tracking of learning feasible and acceptable to registrars, as well as to those supervising and assessing registrars?
- Will in-consultation tools, such as learning logs, identify gaps in clinical experience sufficiently and what is the overall educational impact of such tools?

During the analysis of the transcripts, the theme of 'mindset' emerged from the interviews and so the concept of whether registrars had a fixed or growth mindset was further explored. In discussion with the research team, it was thought that this might better reflect whether registrars were 'just passing the exam' or whether they were developing skills that would take them into a future as a self-reflective learner. A coding sheet was developed based on Carol Dweck's concepts of fixed and growth mindsets and the transcripts were anlaysed to answer as many of these questions as possible.

Method

In order to understand learning in the consultation, it was intended that this qualitative

study would involve direct observation of registrars, followed by the implementation of a check-list based app that would deliver the ability to track registrar learning encounters, allow for reflection, and involve the supervisor at the registrar's discretion. The GPEx app and web-based application, which already existed, were modified to incorporate a check-list application. The prototype for this application was based on a 'to do list', with modifications including the ability to assign priorities to a log (high or normal), add notes (including URLs) and set reminders. Registrars also had the ability to make the log private (accessible only to them) if they chose. Budget limitations meant that having reminders sync with a calendar, and the ability to tag logs were not possible for this research project.

The log synced across both the GP Explore App and the Learning Logs section on the GP Explore website, allowing for ease of use. Once a registrar had addressed their learning need, they had the ability to tick off the log, at which point it would move from the 'Current Logs' section to the 'Completed Logs' section. Entries could also be filtered by priority, privacy and if they were overdue. Registrars wrote in the log if they discussed the issue with their supervisor. Logs could be reset at each GP training term to ensure an uncluttered environment. Previous semester's logs could be accessed via a filter on the GP Explore website.

However, with the advent of COVID-19 it was not possible to undertake direct observation visits of registrars. Consequently, learning adaptation and analysis of registrar learning habits were understood through thematic analysis of interviews with registrars before and after using the GPEx Learning Logs app.

Ethics approval was from Flinders University HREC, with amendments made due to the changes because of Covid-19 (Project No. 8563). Registrars were contacted and recruited via email sent from the two RTOs involved, GPEx and Northern Territory General Practice Education, explaining the study aims and requirements and gaining informed consent.

18 registrars enrolled, 15 registrars in South Australia and three registrars in the Northern Territory. An original interview lasting up to an hour explored how registrars usually learnt within a consultation and the tools they used to assist with this learning, how they communicated with their supervisor and how they thought learning with the consultation could be improved. The registrar was then given access to the Learning Logs tool as a phone app and as part of the GP Explore website. A second interview approximately two weeks later asked about how useful the Learning Logs tool had been, whether they shared their logs with their supervisor, any improvements they might suggest, and how they would envisage the learning logs of the future. Each registrar was reimbursed $125 per interview, paid after completion of the second interview.

Semi-structured interview questions were based around the following and lasted 30min-1 hour:

- How do you usually learn within the consultation?
- What tools do you use to help your learning?
- How do you usually communicate your learning needs with your supervisor or medical educator?
- How can learning within the consult be improved?

After using the Learning Log tool the following questions were asked in a similar semi-structured manner:

- Did you use the learning log tool and was it useful?
- While using the tool did you share data or discuss the tool with your supervisor or medical educator? If you didn't use the tool, how did you discuss learning issues?
- What improvements could be made to the learning log?
- How do you envisage learning logs of the future?

Interviews were recorded and independently transcribed. After a review of the literature, discussions with the working group and based on the research questions, an initial deductive template of codes was proposed. Transcripts were then analysed utilising NVivo and inductive coding allowed further themes to be added. As new themes emerged throughout the process of analysis and discussions with the working group, the transcripts were analysed a second and third time in order to fully capture the richness of the data.

The content of the learning logs was also collated, including whether they were completed, how specific they were, whether the registrar discussed the learning log with their supervisor and whether the registrar added notes to their log or if it was just a heading.

During the analysis of the transcripts, a dichotomy was noticed between some registrars who were enthusiastic about learning beyond just what was 'safe' or only what was needed to pass the exams. Many of these registrars had developed strategic ways of filling the gaps in their knowledge, were willing to ask for help if needed and were pleased to have feedback about their knowledge or skills. These characteristics aligned with the concept of a growth mindset. Registrars with growth mindsets tended to exhibit reflective practice and the characteristics of the life-long learner that seem to be the original purpose of the RACGP learning plans but not necessarily captured by that tool.

There are questionnaires that have been developed for use with individuals to assess whether they have a fixed or growth mindset, but these are self-administered and for doctors the 'right' answer would have been extremely obvious (eg Dweck mindset instrument https://osf.io/pjwgs/). There are also questionnaires that assess the metacognitive factors of insight and self-reflection, but these are more generic and include feelings and social relationships, and do not necessarily apply to learning (Roberts 2008, Aukes 2007). Hence a coding sheet was developed from Carol Dweck's book 'Mindset' and

the Dweck mindset instrument, to try to build a bigger picture of the differences between those registrars with a 'growth mindset' and those with a more 'fixed mindset' who were not enthusiastic about learning, felt insecure if they found they had gaps in their knowledge and did not like to expose their 'weaknesses' to others (Dweck 2017).

The transcripts were reanalysed to find answers to the coding sheet to ascertain how registrars exhibited signs of fixed or growth mindsets in relation to their learning. Obviously, these questions were not directly asked in the interviews and so not all of the questions could be answered by analysing the transcripts. We felt it was a suitable proxy though and that it would give a sufficiently broad overview of how registrars were thinking about their learning using this model.

Quotes were annotated from the transcripts to justify the scores given and then these were discussed with the research team and changes made as per that consensus.

	-1 Disagree	0 Can't really say	1 Agree	Not applicable	Quotes
Looks forward to new challenges and ideas					
Prioritises learning goals and then commits to them with effort and deliberate practice					
Persists through mistakes and failures and learns from them					
Enjoys seeking further information than is immediately necessary					
Looks forward to receiving feedback about their work					
Prefers work when it can be done well without too much effort					
Likes someone else to tell them what they need to learn					
Likes to feel like their work is perfect without any mistakes					
When they're uncertain,					

	-1 Disagree	0 Can't really say	1 Agree	Not applicable	Quotes
feels unintelligent and feels like giving up					
Doesn't like other people to see when they don't know something					

Can't really say = 2 quotes that are conflicting
Not applicable = No evidence either way from this transcript
Final score = sum of all scored items divided by the total possible scored items (not counting those coded as 'not applicable')

During this last review of the transcripts a count was also made of how many registrars used technology to record and track their learning needs, how many used paper, and then how many thought they would change from paper to technology after using the learning logs technology developed as part of the research.

Results

Content of learning logs

Four of the 18 registrars logged more than 10 entries with six of the cohort completing and signing off more than half of their logs. Five registrars discussed issues they had logged with their supervisors, and 11 linked some of their entries to study notes or resources.

Entries were assessed for how specific they were, for example 'ECGs' or 'Immunisation schedule' are not specific, but 'Treatment for osteoporosis with poor renal function', or 'Investigations for paraesthesia with no obvious cause' or 'dosage and duration of Efudex' are specific learning goals that could be marked as 'complete' when the registrar found the answer. Ten of the registrars were specific in more than half of their entries. All of the registrars had some specific entries linked to patients they had seen, and other entries that were less specific with overarching issues they thought they needed to review.

Interviews

Overall, there was a wide range of perspectives on why learning was important, ways of learning, barriers and challenges, and resources used. Also, and perhaps more surprisingly, it was found that in regard to the Learning Logs tool developed for this project, the answers to all of the original research questions were mostly in the negative range. This was surprising, because based on the findings from the WBA ERG the research team assumed that registrars wanted a user-friendly technology-based solution to use within consultations. Instead, many registrars did not want to use technology and preferred to continue to use their paper-based system for reminders and tracking their learning. They did not think the current system was adequately capturing their learning needs. Also they had varied methods for discussing learning gaps with their supervisors that often did not include their own identified needs from consultations.

14 registrars reported mostly using paper, either separate pieces of paper or books, to log and track their learning needs during consultations. Six registrars stated already using technology (either phone or web-based) before the start of the study to track their learning needs during consultations. Two of those reported using technology only occasionally. After the study another three participants found there were advantages to using technology. However, the majority said they would continue to use the paper-based system that they had previously used for reasons such as: it was what they were used to, they did not think it was appropriate to use technology for their own learning logs during a consultation, and they thought that writing something down assisted them to retain information more successfully.

Through the analysis of the transcripts, the registrars' mindset (fixed or growth) towards learning was explored. In our analysis we concluded that ten registrars exhibited growth mindset tendencies, four tended to show signs of a fixed mindset and the remaining four spanned the spectrum between. There was no correlation between fixed or growth mindset and whether registrars preferred paper or online technology, though these numbers are very small. Those who seemed to engage more actively with the Learning Logs app all had a growth mindset whether they liked it or continued to use it or not. This is evidence of their interest in new challenges.

This research aimed originally to explore whether a new tool would assist registrars to capture their learning needs. It is well-established that there is a close link between users and instruments for assessment in medical education. In order to better understand how a tool would align with the users we analysed further the registrar's thoughts and conceptualisations about learning plans and their perceived relationship with learning.

Why have a learning plan and what goes into it?

Many registrars thought carefully and strategically about their learning. They looked for deeper learning points, explored resources other than those websites they had open in front of them, and beyond just the straightforward clinical issues needed to solve the patient's current problem. For most this was not reflected in their formal learning plans, partly because they were not done in real-time as they were prospective or retrospective, and so the RTO would not have insight into their ability to self-reflect or the process they used.

> *"The must-not-miss points or the nuanced points that if you just don't know you will have trouble finding them – because they're stuff that either you never get taught in medical school or they're not regularly covered – and then you get to the pragmatic side of dealing with that condition and you think, why didn't anyone ever tell me that?"*

> *"They are actually appropriately managing their patient and they have more capacity to expand beyond that patient as a learning tool. Then they can look at the conditions they're not seeing, because they are on top of what they are seeing"*

> *"What the guideline is, which ones are available, which ones are subsidised by the PBS, because cost was an issue and all this kind of stuff, so I'll call you back"*

> *"If there was a case where I sort of did do a plan but on reflection I was thinking was that actually the appropriate thing to do?"*

> *"Because the further along this registrar journey I get, the more I realise that something that I thought I might have been happy where I was at is now no longer an expected level of where I want to be at. Or I am trying to fine-tune something even better"*

For others it was a deeper, more philosophical view of the purpose of learning. Some were aware that particularly early on in their training there was a level of 'unconscious incompetence', but that they would never be able to learn everything. For some the strong sense of responsibility and their relationship with the patients drove their learning. These are important drivers for learning that would not be captured in a formal learning plan.

> *"It's the unknown unknown that really scares me…So I don't want to miss anything that if I don't know much about it, it could have serious consequences"*

"Every registrar's learning is going to start form a different place. Some of us have just got out of internship or first RMO year…but there's also variability in terms of people's experience and focus"

"Because it does come back to that on-the-fly learning, because the basis of all our learning whether [the RTO] sees it that way or the college sees it that way, is we're trying to look after the patient in front of us…At the end of the day, knowing you've done the right things for the patient, or at least having a direction for your patient, means the registrar sleeps better, means the registrar has more relevant questions to answer."

"I had a strong sense of that the entire time because I just want to do my job well. I think everyone wants that. They just want to do the right thing, because there's a lot of responsibility. We generally have come into this role because we do want to do the right thing rather than, no, here's a script, away you go, whatever. We all try and learn."

"I think the empowerment stuff is actually what's going to long term affect the health of our patients here. How do you find a KPI to reflect levels of empowerment? …How do we document how empowered the registrars are to learn? It's very very hard."

"But I just need to know, where is the safety point?...Let's say I know 50% of what I need to know about back pain. I can probably still effectively manage someone very safely. Just because 50% of what I have got in my head is what's there and available, it doesn't mean that at some point I didn't come across the other 50%...Because that would be a learning – because GP covers so much. You can't know 100% all the time"

"I'd rather be honest and treat properly than pretend…If I'm not confident on something I'm not just going to bluff my way out – I'd just never do that"

"Making sure I'm still providing – one is learning, but two, just the good service to the person that I'm seeing"

"There are facets of the job. So there's the facet of the knowledge and there's the aspect where you're an individual dealing with complex people who are coming to you in relative times of need"

Barriers to the current way of learning and current learning plans

There seemed to be a misalignment between a careful and strategic thinking around learning on the one hand and the absence of any reflection of this in the formal learning plans on the other. For most of the registrars the current learning plans as a concept seemed to miss the target.

Registrars discussed how overwhelmed they felt when they first started in GPT1 and how difficult it was to face patients when they didn't know what to do, to prioritise learning issues. The style of self-reflective learning expected in General Practice was very different to what they were used to in hospitals and they did not know how to approach it. Some continued to feel overwhelmed in their senior years, some were tired of how much they needed to learn, but most had worked out a strategy by then that worked for them.

Some felt that the current process was too cumbersome with little apparent value. Others felt that they lacked appropriate guidance to help them deal with the tension between the enormous scope and the uncertainty of General Practice.

> *"I think the most important thing is the first term, because many of us from hospitals go straight to the clinic, and it's a huge step. Very different, and I thought – if I have some kind of plan or guidance, that would be good"*

> *"But now I'm not doing the log book because I stopped it probably three days into practice. It was just way too cumbersome"*

> *"Sometimes some people just look at you. It's hard for you to decide which way to go…It's overwhelming and information overloaded and you just feel like you just don't know what to do"*

> *"A lot of that learning was very case-specific in how it was driven, because I was doing it for nearly every patient at the start, I could only go into so much detail, it was just like, oh, what on earth do I do with that, I don't really know and I'd just learn off that single case"*

Many struggled with finding time and motivation to do the learning they needed to do. Some felt they needed more structure for their own reflective learning and others wanted less structure. How to keep track of their learning and access the information they had gleaned in the future was something that many struggled with.

> *"It's like when you go to do the study, you dive into a giant pool and there's no lane ropes. So you find yourself swimming around a bit rather than just getting to the other end of the pool…so maybe that's my fault for not applying a structure to my learning…the danger is that you often collect a lot and then can you find them again"*

> *"If I don't look at things straight away, I forget why they're relevant, or I just don't get around to them, because it grows quite quickly, every single case I found I'd probably be putting down a point. At the end of the day, when you're tired, it's hard to look at that list and go back to it."*

> *"But then I've forgotten all the things that I've been looking up along the way"*

"I don't want that piece of paper to just become a long list of scribble that's carried over for years."

"I don't have a lot of time to gather the information, like I need to do it that weekend or that night"

Some did not seem to understand the purpose of learning plans at all and saw them as a stepwise script of what to do along a linear pathway, rather than a development or delineation of boundaries navigating a complex and rather unpredictable learning context.

"I guess it's much more ad hoc as opposed to planned because things will just pop up and I'll say, oh that's what I'll learn about this week. I think the learning plans probably work for lots of other people. They just don't work for me because I don't follow a structure, I don't follow a plan, I learn things as I go".

"A learning plan means you've got it on paper what you're actually aiming for. If you're verbose like I am, it actually helps to have this summary. That way your supervisor can say okay we've got this. Set amount of time, this is what you've written down, tell me about it. It's put in that structure is helpful. It forces you to actually have to stick to something, make a document and actual plan. I guess it feels like it's a demotivator is when it's not really tailored very well"

Most thought that the current learning plans were not useful and were just tick-boxes that did not reflect either their learning needs or how they would address any gaps. They were quite separate from their actual learning and so struggled to engage with them.

"I started with a learning plan and by the next day I had newer kind of things to look up and my learning plan fell down the priority list and I never got to it in the end because I probably put too big concepts there."

"I have no reason to ever look back on my learning plans which I wrote as they're all specifically vague...it just means nothing to me"

"During my GP training, I feel like it's this process of punishing you if you don't upload the paperwork. If you don't go find your supervisor quickly so that you can fill out the next piece of paper to prove that you've done it…it felt like this huge weight on you. Oh goodness, how am I meant to get this done?"

"I think learning plans are onerous because they're so divorced from real life – like I don't have time to write a learning plan when I think of something that I need to do because they take quite a long time to write…Learning plans feel a bit artificial because I have to sit down and think right, what do I need to write a learning plan about, which doesn't fit with the way that I learn".

"By the time you get to this stage you already know how to learn. Otherwise you wouldn't have got to the point where you are…the SMART learning goals… just feel more arbitrary, oh yeah, whatever, I'll just quickly make a thing, which is not actually meaningful to me at all"

"Calling it a learning plan – a lot of it is really just a revision plan because there's not a lot that I have no idea about…it seems a bit pointless to try to tease out really specific areas I need to focus on when realistically, I'm going to be trying to cover the whole curriculum anyway…it doesn't fit anywhere for me, it's just added on"

"The learning plans I just find very vague and I fret about them and then I don't do them and then I get reminders and I'm in trouble again"

"I've got to think of another thing to learn kind of thing, when I'm learning everything all the time…now I think I probably make multiple non-formal learning goals all the time, and I don't really always address them in totality. Maybe a proportion, enough to get me through what I needed to do for that particular case."

"I'm sure that the more you make people do things, the more people try and get out of doing things."

Future learning plans

Registrars had ideas about what they would like future learning plans to be like but most emphasised that everyone would be different and that it needed to be responsive to the way they liked to learn.

"I'm sure you're finding a whole range of ways that people learn through these interviews…everyone has their own little perks, so it's hard to find a one-size-fits-all, I imagine"

"Everyone does have slightly different learning styles, so I think maybe more of a flexible approach to sort of have a bit more of a leeway for people to come up with their own way of learning that's still able to fit the assessment criteria"

"Having a webpage open, or having your phone there is probably going to be a good point of call...If I'm not writing things down immediately, by the end of the day, when I've seen another 20 patients, I'm going to forget at least half of the learning issues I probably should have had"

"Having it very customisable, where you can pull in resources from other places that you found helpful…something that can be readily looked back at is going to have more relevance"

Some registrars may need more support to be engaged with their learning and recognition that this was more of a bespoke activity for that individual rather than another form to fill in.

> *"If you could see that they were dropping off, especially in the way that they were approaching their learning, then maybe you could feed back to their supervisor. Say maybe could you work a bit more on engaging with this registrar. They've lost motivation, they're not interested. What's going on?"*

Registrars wanted their current learning and study notes to be accessible in the future.

> *"If you were doing a case and you found a really good resource that you'd opened, you could copy and paste that link into a learning log style thing or a learning note rather than a learning goal"*

> *"If there was a spot to upload the Word documents of all my notes about different topics, then I could just use that as a place to file my notes…with some sort of search tab so that I don't have to keep scrolling through them"*

> *"I'm going to record down in study books around different areas that I've learnt about, and I'm going to incorporate that knowledge from different various sources, and I'm going to constantly build on it based on the patients that I've seen. So, you could put that in your plan, and you would submit that, and that would be signed off."*

Some thought that being accountable to a third party was still important, and found their supervisors or medical educator's input very useful.

> *"I think the focus of that learning goal is probably where the money's at. Because anyone can come up with 50 random learning goals that they felt were important to them on that day. But actually that's their opinion of what they think they need to learn. The fly on the wall might say, actually, there's probably only three things that I want you to learn from today. The rest will sort itself out"*

> *"The registrar can't always be the guide of their own learning. I think there needs to be some reflection from a more objective party. Because you can't see it in yourself sometimes…you need someone to constructively say, look, this could become an issue for you. Just look out for it".*

> *"I think there's a tension in the whole process, because obviously we're approaching the learning as adult learners which requires us to have that self-initiation and drive to do it all ourselves, but I think one thing that would be really valuable would be if the supervisor or medical educator initiated the conversation back to us to say, just*

wanted to touch base about your learning goals and to have them prompt us would definitely make me think about it in a formal way"

Reminders, the ability to mark issues as completed and to prioritise issues were also important.

"I am a big fan of to do lists and being able to complete or cross off tasks, it's very satisfying...it can give you a sense of what you've already covered when you look back on it…a bit like an informal gap analysis"

"If you haven't engaged with it for a few days it starts sending you a reminder like we missed you"

"If I was making a time limit that would be useful"

"I much prefer the high, medium, low priority learning goal than the I want to do this learning goal in one week, one month, one day"

Studying for exams

Those registrars who had not passed their exams were acutely aware that this was one of the priorities of their learning. They tailored their learning with this aim in mind and most already had a 'study plan' about how this was going to happen. Formal learning plans seemed a bit superfluous to some as they thought they were already learning in a structured way.

"So every single GP reg that I've come across already has some sort of – whether it's loose or highly structured - there's some sort of plan in place that they're using as a study plan for their exams. So it kind of defeats the purpose to explicitly call out these very arbitrary kind of learning things that you put in these plans because what you're actually doing is, you're going off your study plan, which is probably a vast document of however many pages"

Some felt a need to be more structured in their approach to how they studied for their exams and others would have liked more guidance on that, and their learning plan to be useful for their exam preparation.

"You could just have 300 conditions or whatever it is for the GP exams, and there you go…If you just want it to be skeletal then that's how it comes and you can just expand as you choose"

"Then you can just reference back to that…That could be more beneficial because it's got that long term exam focussed component to it"

"So maybe that's my fault for not applying a structure to that learning. Which I think is going to be a bit more a motivating, an efficiency motivating factor…Already preparing the first topic I've realised, well, I'm spending too much time"

"If I could set a reminder to myself one month before the exam or something and put an actual specific day in for it to show me a pop-up to say, don't forget to research this today, or don't forget to learn this"

"I've read before and I thought, oh, that resource is really good, I need to remember to check back on that when I'm studying that topic for the exam. So perhaps if I could save that link somewhere, then I'd remember which links I wanted to go back and look up for the exam, rather than going back through it all again."

"I've got study books that I use for all my exam prep…Basically, when I come across something I don't know, my first port of call is to refer back to those study books and then I essentially just add information to those study books"

Many felt exhausted from trying to juggle working, training requirements, family and studying and some had lost their interest in any more learning after they had passed their exams.

"At the end of training, which is where I'm at, after a while it just feels really exhausting to study"

"All the way through my whole life actually I've really enjoyed learning. Yet I just feel like I've come – almost hit a wall with wanting to learn. At this point, I'm just a bit sick of it all."

Others felt that they couldn't really start learning what they wanted to learn until they had passed their exams and so were actually putting their learning on hold until then.

"Because it does come back to the fact that you need to know the curriculum and even if you never want to do skin excisions again in your life, you will need to know about skin cancer medicine and all that kind of stuff…whereas at the end, when you're approaching fellowship or leaving GP training, you might think, actually I want to do a lot of women's health or a lot of Aboriginal health or more mental health and try to think about what areas then"

"What I did for most of last year was, because I was preparing for exams, I kind of felt like I couldn't just learn from patients. I had to stick to my learning plan…Whereas now how I learn is probably more patient-centred"

"My main targets are to learn the stuff and to pass the exams. It makes sense to do that because if I've got a passion for something then I'll use that passion to use the

learning. But I don't know whether that gets me closer to where I need to get to which is passing my exams and retaining the knowledge".

Study groups and regional workshops

Using learning plans in a group environment such as a study group or regional workshop or developing learning plans from these discussions, assisted some of the registrars with their learning, particularly for exams. However again, all registrars and all groups were different. Some focussed on just studying for the exams, and others focussed on day-to-day patients and still others did both. Some integrated their own learning with what the study group was doing together.

"Anyway, just reflecting on my favourite learning stuff, I really enjoy group learning environments. I'm quite an auditory learner. Also having immediate feedback from people, this toing and froing of information and then testing. I actually really like that"

"I feel like if I saw other people's learning logs, it would just stress me out. They might feel the same. However, if we all made our own learning logs and then we realised there were lots of things in common, that would probably be helpful to identify areas that we could work on together".

"I guess everyone would have their own style as well. So I can imagine one particular person in my study group would have hundreds of little things on here, whereas others would have it a big broad, study cardiology, sort of stuff"

"I don't think I really would share my learning plan with anyone, no matter who they were".

"Just going back to those education days with your medical educator and your little group, I actually found those really useful for learning. I think it's just because you're so isolated in GP that you just don't really have any facilitated contact with any of your peers."

"I'm a big fan of learning plans, because I like to have a plan. I find that especially when I was studying for the writtens because there was so much content to cover. My study group was really good in that we got together really early and we kind of fleshed out exactly what we wanted to cover in each week. And we mostly stuck to our learning plan, so in the end when we got to the exams we felt like we'd basically covered everything we wanted to cover"

"So we basically created a timeframe and a learning list of things that we needed to go through and allocated them to each week like a schedule and then would write our own documents each week"

"There would be times when we would discuss the things that I'd seen on the day or what I'd looked at myself would form part of what I talked about in the study group."

"I think when I was doing my study time I would consolidate from the post-it note to a kind of consolidated list, I would then make that connection between topics that I was going to cover in the study group and things that I had thought I needed to follow up on myself"

"We just had a bit of a collective learning plan together, like okay well clearly we're all struggling with this, let's focus on this next time."

"If it's coming up in the study group...then inevitably I'll incorporate the stuff that I've done previously because it just adds a little bit of reality to it."

"There's been a couple of times where we've presented about a topic and then other registrars have seen patients with the same presentation in the week after. They'll check in and go this part of that actually turned out really well or whatever, so it sort of for us as well it's making the learning a bit more relevant".

"You're actually learning from each other a bit more, so it's good incentive to do a good job"

Learning tools, prioritising, memory aides, and collating resources

Every registrar had their own way of learning, prioritising their learning needs, reminding themselves about things they wanted to learn, and collating their resources. For some this was done on-line, for others in books and on pieces of paper. For those who mostly worked on-line, they had either developed, or wanted to develop, ways of pulling learning plans and resources together, prioritising and setting up reminders. Some registrars found the Learning Log tool which was part of this research, was their first experience of pooling everything together in this way. Others already had Google Docs, OneNote, Evernote, Suitcase, or some other collation software in place.

"You can then cut and paste that into an email and it's already in a document"

"It does make you prioritise your learning needs. I didn't have an endless list of whatever, so I was like, will I actually look this up? Yes, I'll write it down".

"I think I would use this like I was saying as a live referencing or learning tool, because it does allow for that in-between consult, our therapeutic guidelines say this is the first step, second step, okay, I'll write that down and then I'll look up a bit about it later."

"I save all sorts of documents under different headings and different folders, and I can locate them easier next time I need to access them. But I don't think I have a log, a proper log as such".

"I do like that you can see your completed logs. I think that is useful, because let's say you actually put some information down that you'd studied on that occasion and that was the whole purpose of you putting that learning log in….You then have a way of refreshing that knowledge quite quickly if you're like, I know I wrote that down there, now let's quickly look at it."

"The ad hoc nature is opportunistic. Like it works because you've got a patient in front of you, they've got an issue, and it's worthwhile learning it. But what I need from that is something that's happening in the 10 minutes or the 5 minutes. Whereas to put it deep into my memory I need a base. The base, I find just from my learning style, I get from the syllabus"

"I think it looks simple and it will be nice to see if it will work to just have everything in one place, that's how my brain likes to work"

How registrars learned, prioritised and collated changed throughout their training. There was no 'one-size-fits-all' for the individual at any point in time.

"But a lot of that learning was case-specific in how it was driven, because I was doing it for nearly every patient at the start, I could only go into so much detail, it was just like, oh, what on earth do I do with that, I don't really know and I'd just learn off that single case. I wasn't really taking notes, it was more rapid-fire, practical knowledge. I would save resources if there was a good guideline…But I wasn't actually taking my own learning notes"

"It's do I need to anything right this minute, yes or no? Can I manage it here, yes or no? Are there any other things do I need to put in place? So I try and – I probably do that more subconsciously now. But if I am feeling a bit stressful I try and consciously think about those things."

Some found learning points that they did not think were relevant for the future, and others that they wanted to save.

"Usually I would just delete it. If it's something I want to keep tabs on or I want to know that I thought that was an important learning point I just leave it there, even if I have done it."

"I don't really ever go back and look at what I've written down for study purposes"

Some found ways of motivating themselves through the learning systems they used. This was mostly with ticks or crossing out what they've finished, but others were more innovative.

> "I don't have a nice reward system for it. I quite like the ticks."

> "I call it my To Do list but I also have my Have Courage and Be Kind list because if reminds me not to be overwhelmed by all those tasks".

> "Every day I refresh that message to myself so it reminds me to look up this or that. Then it's also nice at the start of the day or the end of the day to take things off the list and acknowledge that I've learned that or I've done that task"

> "I would put it in a note to myself. Then afterwards I'd put a little tick box using a little bracket that makes a little tick box"

> "If finished, I cross it out after addressing the issue"

Most felt that linking what they've learnt to an actual patient consolidated their learning and made recall easier.

> "Learning from patients is really good because it actually makes things stick in my brain, because it's all well and good to just read something, but if you actually see it or do it with a patient, it's really helpful for knowledge retention"

> "It helps me to commit the presentation to memory if I can read about the condition, know the patient, know what I've done and then be able to follow up that patient about what worked and what didn't"

> "As soon as you tie the person to the topic the knowledge sticks just that much better. It's just so much easier to remember when you've got a face in your mind when you're reading a topic"

Registrars acknowledged the need to prioritise their learning, but many struggled with a realistic process for doing this. It was of course about the urgency for the patient, but also about their own confidence, particularly for the exams. This balance changed over the course of training as learning and confidence increased.

> "Probably when I was less confident, or needed more assistance, then I would potentially do it on the day…but most of the time now it will be a learning point, rather than something that I'd have to immediately seek help for, for the patient."

> "I guess maybe the ones that are going to be more relevant for patient care I'm going to raise first"

"There's just so much going through your own head, and just trying to find the practical stuff is difficult"

"But for prioritising things, definitely at work if I have time, I would be going through what would be important for my patient encounter. But at home, I would go through like, it will be collaborative with my exam perspective and patient perspective".

Paper versus tech in the consultation

The majority of registrars preferred to take notes using paper during the consultation. Some used the computer using Sticky Notes or another piece of software to log learning points, some sent emails to themselves or saved items for learning in their actual Medical software. There are pros and cons for each. Some used a hybrid system, and others used all paper or all technology. Some started with paper and then moved onto more technological methods.

"The main thing is that…whatever path it takes, if it's an app or web-based or both, it's just that it's really easy to use and fast. Actually it's more than an electronic piece of paper"

"It's kind of two books, one little diary…and one big book… I do have a computer, but eventually found it too messy. Sometimes I just couldn't find anything"

"I have eTG, AMH and a few other guidelines open, which I reference quite frequently…then I'll use either Notepad on my phone which has reminders, so that it keeps coming up until I tick it off, or I've got a notepad that I'll have specifically to discuss with my supervisor."

"At the beginning I was just writing them on the prescription only bits of on the scripts that I'd have lying around. But then those would just get thrown away, or be lying in my drawer, forgotten. Then I had a dedicated notebook for a period of time…Then at another stage, I was putting Post-it notes on the bottom of my monitor"

"I write them down on a piece of paper or if the patient's left, then I write them into my phone in my Notepad, and then I try to look them up that night or that weekend and try and do them straight away"

"The little bit of paper is just look up this, then I do look it up and then I type my notes onto a Word document, upload the Word document to my Google drive. So then I've typed it, so I remember it, but then I've also got the notes there for the future, and then the piece of paper gets thrown in the bin because I don't need the piece of paper anymore"

"Obviously the training stuff that's compulsory, that's all online. Like the learning plans they make you do every semester and mid-semester. But beyond that, no, everything I do is hand-written"

"Previously I used to do all hand-writing but for the last three years I was doing in the computer only."

"I have a running message to myself on my software system…I also write down in a physical book as well some particularly difficult things to talk through with my supervisor and then I've got that to look back on and reflect on those things that I have learned"

"I put it in a book. I'm not good with using applications or reminders on phones. But some people are good at that".

Some had clear reasons for using one or the other, and other were continuing previous ways of learning that was still working for them. Many would not use their phones during consultations for reasons of professionalism.

"I do a lot of nursing home visits…and don't have access to a computer and stuff. I find it that much easier and so I jot down all the patients I've seen so that I can do the billing, but also write down what their issue was and that is useful then for later"

"The other reason why I use the actual handwritten post-it notes is because I do feel like it's not really socially acceptable to whip out your phone partway through the consult and say, actually, I've just got to pop that into my learning log or into my phone. I also don't think patients would feel comfortable with it. I think there would be worries about confidentiality and stuff like that"

"So I find that clients already don't particularly like the computer thing"

"I don't think taking out a device, or a phone, would give the best professional appearance. So I just use a notebook"

"I just started off using the online one instead…As opposed to picking up my phone, which looks unprofessional if the patient is there"

"So I've got a notebook that I keep next to my desk, and then if there is something at the time of the consultation that I need to look up, I generally write it down…I don't use any form of electronic recording at all but in reality it probably would be really handy because then you wouldn't have to carry something physical around with you all the time".

"It's all handwritten. I'm quite old school when it comes to that sort of thing...I don't really keep many online lists"

"I tend to write things down on Post-it notes and make written lists with pen and paper. But one of the things I realised is that I can't do that when I'm out, so this [learning log app] might be something where if I'm out, I could use it to record"

Some registrars found writing something, or holding it in their hand, helped them to learn.

"Like there is the physical aspect of holding something…If I have to remember something for tomorrow, to have it in my hand versus knowing that it's somewhere on my phone, like I feel like I can know it's on my phone, but then there's the thing of having I on my hand. There's an aide-memoire of having a book in your hand and highlighting"

Supervisor

The supervisor was generally considered to be an important resource for learning. This very much depended on the registrar themselves and their relationship with the supervisor.

"I don't mind if someone sees my neuroses or my shortcomings, so that wouldn't worry me too much…I think the sharing part could be a supervision discussion generated in a way. Either, what did you learn about? That could be a consolidating discussion…I think some people might feel that if they wrote something too simple…then maybe their supervisor might be thinking, why are they still looking at that? They're a GPT3. What are they doing? Which is a perspective thing"

"A lot of things I would be talking to my supervisor about either I would be not quite comfortable about, or they wouldn't fit into guidelines…Sometimes it would be for reassurance purposes more than anything else, just like is this the right way to approach this?...Sometimes it would be more out of interest's sake, or if the case was something I could learn from"

"In the end, that's all to do with the supervisor/mentor training relationship I think".

"If you wanted to make it more onerous with that accountability, then it could be you do have to tick off x amount with your supervisor…Lots of supervisors are pretty laid back when it comes to [RTO] assessments anyway…But it might be a good base for some people to say look, I've got these learning issues, I think this would be really good to discuss with my supervisor. I've gone through this. Do you mind going through it with me or could you mark me off?"

"I guess it depends what practice you work at as well. I think if you worked at a practice where you didn't regularly meet with your supervisor, them noticing that

there's a bunch of logs piling up that you want to discuss with them might be an extra incentive for practices that are a bit less hands-on to meet with the registrar and say, oh yep, we could have a session where we go through these things"

"Let's just talk through [what you've put in the learning logs app] instead of looking at whatever I've done on the modules and stuff"

"I'd be fine with the supervisor to see the things that I've listed as learning goals, but probably not all my notes on the subject…So the supervisor knows that you're researching, and you keep track of what you're researching"

"If I didn't have my own learning plan, and I was like purely learning form patient encounters and supervision encounters, they would be helpful because it would help me reflect on, what are my knowledge gaps and what I need"

"I do find the learning plan is helpful to the extent that the conversation to set it up helped me to formalise my thinking around learning. So I think that is definitely a useful part of that, having that face-to-face chat with my supervisor, and often the practice manager is involved as well…I find that formal process of just saying what am I going to focus on learning and building skills in over this time period"

Supervisors are also a role model for reflective, life-long learning but can sometimes be a negative role model, which can adversely affect the registrar.

"I think the biggest thing is probably just having a good relationship with your mentor, or you supervisor. A GP who is keen on teaching and keen on learning, it flows to the trainee."

"I feel like in my entire training that I've been whipped to try and keep me moving with my learning and my training. It makes it harder and harder to enjoy it"

"The supervision here is a bit thin sometimes…I have a friend who is a GP supervisor. It was so refreshing talking to him about his approach in his workplace because I was confiding in him about some of the things that I know I'm not good at. I was like I don't know what to do. It makes me feel like a failure, like I'm never going to be able to continue being a GP. I'm terrible at this job. He was like, actually all of us felt that way – like that at some point".

"Just being open and honest about that and saying okay, why don't you come back and see me next week in the morning before you start seeing patients. Why don't you tell me a 15 minute spiel about whatever topic it is that you thought you didn't know about. Making it manageable as well. It's got that tangibility aspect to it. It's go that testing and that achievement aspect to it, which is what we all relate to, I think. It's

also got that positive vibe around learning, but it's not unmanageable. I think as a registrar, you feel like there's so much you don't know. You feel overwhelmed"

"I saw one of my supervisors, he always has a little notebook in his pocket"

Some supervisors were not 'tech-savvy' and so most interactions were verbal or hand-written, with few registrars actually using technology to discuss learning issues with their supervisors. Some registrars did not find their discussions with supervisors actually reflected their own learning needs but were led more by the supervisor's agenda.

"Like in the tutorial the other day [my supervisor] was bringing out his notes in a notebook from the 1982. They're great. There are things that don't change. But the idea that he would log into the system…is not going to happen…It's a mindset. Well he's got a system that works. He's been very happy with the system. When there's change there's an element of cost to him…For the extra little bit, for him it's not worth it"

"She is not a tech person so I haven't shared"

"This year I haven't really had that time to sit down with any of my supervisors. I've had plenty of conversations with them, but it's never been formalised in that way"

"I don't have much of an opportunity to talk about the learning log stuff with my supervisor"

"So part of it was that I have found it a bit challenging to have that kind of conversation with my supervisors…I very rarely have a chance to talk about that kind of thing like learning plans or learning approaches or that sort of stuff with him."

Growth Mindset

The majority of registrars who took part in this project predominantly demonstrated characteristics of a 'growth mindset', though as previously mentioned there is a spectrum from growth through fixed mindset and many displayed features of both. The cohort who volunteered for this research are very likely to be skewed towards a growth mindset as they would have been interested in research and contributing to change.

Most of those with a growth mindset acknowledged that life-long learning was important.

"If you stop and reflect, you're actually learning a lot and you're constantly looking for stuff that you could be adding to your repertoire"

Registrars with a growth mindset talked about 'ego', 'pride' and 'embarrassment' being barriers to learning. If they did feel embarrassed, they had ways of working around that and

being self-compassionate. It included listening to their own uncertainties and not feeling afraid to ask.

> *"It's the level of comfort you have around your ego or pride really. We're all here to learn, and if you can't remember how to listen to a chest, you probably still need to learn it. It shouldn't be that embarrassing that you can't quite remember. This is the kind of space that's designed for those kinds of things. So, do it."*

> *"I usually frame that as, I'm not too sure what this is so I'd like a second opinion which I find patients tend to appreciate, rather than me saying I don't know what's going on, I need help."*

> *"Sometimes something is clearly wrong and then other times it's like, oh this doesn't feel right, and then that's sort of a prompt to talk about it with someone".*

> *"Some people hate testing, but I find it really reinforces my learning. If I get it wrong, in some ways it actually strengthens the reinforcement for me"*

> *"I think you should define your personality at the start of being a registrar and then actively try to dismantle it over the course of your training…I know, because I can happily admit that like a lot people [I'm] probably leaning towards the Type A, obsessive compulsive oriented and that's an ongoing learning goal for me"*

> *"Being okay with the fact that you now don't have access with ease to a certain bit of information that you thought used to be essential, but actually you can do without with experience. Learning to live with that takes a bit of adjustment"*

They saw learning as exciting and fun and an 'adventure'.

> *"Learning is a choose our own adventure really…A live, expandable choose your own adventure."*

> *"Hey, here's a fun case, or what would you have done, type of thing, out of interest's sake"*

> *"Let's see that as a thing that you can learn and work on. It's actually a positive thing that you've identified it. Let's work out how you can improve on it. Flipping around to – instead of making it oh gosh you're terrible because you don't know something, to flipping round and going oh well that's exciting you don't know something because that's how we all are."*

> *"I had a lot of fun doing the learning logs on the computer… It's not just gratifying, it's actually really encouraging for me to feel like I'm still learning things"*

And understand that part of adult learning is taking responsibility for your own learning and working hard to achieve their goals.

> *"What steps you go to, to address this learning need, how long it will take to do, when will you review it, how you monitor, that sort of stuff, so smart learning goal stuff. Which I don't think is a bad thing, because it's adult learning, so you should be taking responsibility for trying to find information when you identify a need"*

> *"If the GPT3 is going, far out, I've never covered this, I need to go back to basics – so the need of that learning is available at the chosen level, at the discretion of the registrar."*

> *"You kind of think, is there an easier way? Is there a better way? Oh no, I'll just work harder"*

> *"But it's really more fun to do than the learning plan. You're not feeling forced to do because you can do it as you go"*

> *"I also am writing a bit of my own list of things that come up repeatedly or that I don't feel I've done well, or I did have a few absolutely unwell patients, so the slightly unusual presentations, how did I manage those situations. I'm tracking those sort of things a bit informally"*

> *"It's much more about me taking ownership of that and just saying, this is what I need to do and here's how I'm going to do it"*

If registrars with a growth mindset made a mistake, they were not afraid to admit it. They were also happy to admit that sometimes the patient was the expert.

> *"Actually, no I shouldn't prescribe that antibiotic, or I should have ordered that test as well, I'll usually call the patient and document that conversation as well in the notes"*

> *"If something that's a rare disorder, and they know everything about it obviously, I just say to them I'm sorry, I don't know a lot about this condition. Tell me what's been your experience of it. I actually let them be the expert I guess, because they're the ones who've lived with it"*

But they still acknowledged that the learning environment needed to feel safe in order for them to admit that they didn't know, or that they had made a mistake.

> *"If I get something wrong when I'm discussing with someone, if it feels like a safe environment for me, and I can say I don't understand this"*

Fixed mindset

Listening to the registrars talk about their learning and then analysing the transcripts, it became clear that there are many features of the current General Practice training environment that seem to encourage a fixed mindset. Some of the registrars with a growth mindset were able to point these out as barriers, but some of those who exhibited more fixed mindsets talked about them from their own experience.

Those with a fixed mindset tended to have an external locus of control. Often their focus was only on the exams or their assessments and nothing else.

> *"The only learning goal I have at the moment is to pass the written exams next year"*

> *"I think if we have an instructor make a plan, that would be good"*

> *"My goals are like, studying for exams, and that's not an acceptable, specific SMART plan thing"*

> *"So the nature of self-reflection is something that I know that is important and you want to capture but I do it more out of forbearance. It's not going to get me into term three. Getting into term three is getting the forms in on time and passing those exams"*

Rather than focussing on what they needed to learn, they often focussed on what they now felt that they knew, especially if they had passed the exams. They often did not want to expose their own lack of knowledge or vulnerabilities to others and castigated themselves for not being at the level they thought they should be.

> *"Because I just feel like I know a lot now, not like before"*

> *"I will be joining [a study group] once I feel a bit more confident on the information"*

> *"I feel disappointed for not being on top of things"*

They had little understanding of assessments being tools for further learning but saw them just as hurdles that needed to be jumped. They would choose the simpler and easier way to do things rather than struggle with something more difficult.

> *"Like just a bit of a laborious busy work-type of task…You're just making up these points, I find, self-test, self-reflect, talk to supervisor…but then you're just making stuff up anyway. So that's how they ended up being for me…I'm not going to look back to teach myself to learn or to be like, oh yeah, I've learnt that"*

"I'm sure you – just pick the simplest ones. Then they can just tick all of those off. Pick their easy targets and tick all of those off."

"Because if they have to jump through hoops for everything they enter, they are not going to want to enter anything"

"I've just been quite busy and so just haven't managed to get around to doing most of [the assessments]…Probably because I don't really see the point."

"Yeah whatever, I'll just quickly make a thing, which is not actually meaningful to me at all"

They resisted change and new ideas, even if they had some understanding that it would be useful.

"They can see the benefit they've got. But they have to see what's in it for them before they move, because the inertia is huge"

"But in real life, probably I don't really do that much"

"I'm not really a very creative and innovative person"

"I'm an old dog. I struggle to learn the new tricks"

The Learning Log app positives

There was a wide variation in what registrars liked about the Learning Log tool as well as diversity about the way they actually used it. They did like that it was a clinical tool used in real time. Most felt that it was more applicable to be used as a formal learning plan than the current learning plans, mainly because it was logging the learning in real-time and so was not using prospective or retrospective ideas.

"Part of the convenience is that I can write down whatever nonsense I want and it makes sense to me. Even if it's something really, really little"

"I think it's a very flexible and simple idea and I don't think you need to make it complicated"

"There's some where it's just a pretty specific question and I'll sign them off, I'll tick them off pretty quickly, but others are there as a reminder of things that I've got to slowly take a bit of time to learn about because they're a bigger topic"

"I like how it's more live or real time. As opposed to having all of the beginning of semester learning plans that you make up all at once at home, when you are not

really thinking about your clinical work. It's a lot more applicable when it's like I've thought of something…I'm going to enter it right now and it takes me five seconds to enter it. As opposed to running through all the [smart] steps".

"Sometimes I was writing them down while I was going to lunch, waiting for something in the microwave or at the end of the day"

"They're just much more dynamic and it's much more I think reflective of what the actual needs are. Because I can add to it, I can edit it, I can change it. I can put in URLs or my little notes about what my references might actually be…I can just make a much more practical pragmatic document."

"I anticipate you'd be able to do that continually, rather than putting in your learning plan at the start of semester and then kind of forgetting about it maybe. Or coming back to it in a few weeks or whatever. So yeah, I like the idea that this is much more just an ongoing process"

In addition, some registrars, did use the Learning Log tool to log issues to discuss with their supervisor, however it was used more as a prompt to remind them of issues to raise in the structured teaching sessions.

"So then I was at work and [the reminder] came up and it was something I wanted to ask my supervisor"

"It's so flexible. You can put in all the things that you need to do for that upcoming [assessment], or something you want to bring up with your supervisor"

"Things that popped to my head that I needed to do or discuss with the supervisor"

Some registrars had never tried using a tech way of logging their learning and could see many advantages to using an app or web-based learning log.

"I liked that I didn't have to keep pieces of paper"

"It means that I have an electronic copy of my learning goals, instead of having to write it down in a book, and then sometimes I forget my book".

"It's been really helpful for things that I haven't needed to look up right away, where I can just quickly jot them down and then they're there for me to follow up on."

"Usually I just write it down so it's somewhere there for me. Then reflect back. This works better than a post it note or the bottom of a script page, which I just otherwise lose"

"As it is software based, so we can access – even if you don't have the book with you, you can access from any computer…So it is a reliable place, I think. Better than writing down in the book and probably I might leave it somewhere".

"It's kind of helpful, because it's just keeping it all in one place. So it just serves exactly the same purpose as my normal bit of paper. But I guess I've always got my phone on me and I don't always have a bit of paper on me"

Some registrars also liked that there was a section for notes and that resources and links could be stored there.

"I really liked the fact that there was a note section…In a way that could possibly make things a little bit more efficient. Let's say you had 10 minutes, you did a little bit of reading, you wrote something down. You can then cut and paste that into an email and it's already in a document. You've saved the typing. There's not a second double-handling of that information."

"I've liked the flexibility of putting as much as I like in the notes. So, for instance, one thing that I've put in there for me to look up another time, I've put a whole web address in there and it's quite long. So I can just copy and paste that for later, when I've got time to look at that"

"You can just put in a title and then put in whatever notes you want to and you don't have to fill out a lot of information. It means that you can be very quick about it and you can just write something to trigger you so that you then put some more information later if you need to"

Registrars liked that they could see the logs they had completed.

"I do like that you can see your completed logs. I think that is useful, because let's say you did actually put some information down that you'd studied on that occasion and that was the whole purpose of you putting that learning log in…You then have a way of refreshing that knowledge quite quickly".

"I liked looking at what I'd written down. It was like a completion list or an activity list, a diary in a way…you actually did cover some stuff".

"It's very satisfying to have something I can tick and it goes away, but it's still there and I can reflect on it later, oh, look how much I've done this week, that's nice"

"I like that I can access my completed logs, because it's very satisfying for me to be able to look back and see I've not wasted my time. Look at all these things I've learned."

They also liked that their learning logs could be prioritised. For some just the process of deciding if they would write it down in the app or web was a way of sorting out what they might actually look up.

> "It does make you prioritise your learning needs. I didn't have an endless list or whatever, so I was like, will I actually look this up? Yes, I'll write it down. So that was a streamlining process that I found."

For some registrars who previously had had difficulty prioritising their learning, the action of logging the learning need in the Learning Log tool was useful.

> "By putting it in, it was like the extra commitment to learn. So rather than having it as like a vague thing"

> "I will mentally say, yes, that's something I should get on top of. But by mentally doing it and then physically writing that I'm going to do it, it's like a prompt that, yes, this is important, and so it has been done most of the time"

The Learning Log app negatives, IT issues and suggested improvements

The Learning Log and Web application had a mixed reception. For some, it was a really useful way of logging what they wanted to learn, and they had suggestions for how to improve it. Others could see that it might be useful for some registrars but just not for them as they were not IT literate enough, did not like using IT during a consultation, or had a better system already in place. Therefore, it would be important to utilise a system early in training and consider having a post-Fellowship log to encourage a growth mindset in the early terms of training that would flow into the post-Fellowship space.

> "If someone who loves tech or who's familiar with technology it might be good. But for myself, I am not very good at that"

> "The computer is a bit difficult for me"

> "Then the app logged me out and I couldn't remember my password, so I haven't used it…But to be honest, I don't think it was that helpful really"

Even those who used their phone in their every-day life, found that using the log on the phone was unacceptable and preferred to use the web.

> "I found that using the app was a bit finicky. And in the end, I think I ended up doing it mostly on the computer in a web browser because I just found that was more reliable"

> "Then it got a bit too much work, so I resorted to doing it in the web browser"

"Just being a bit slower than a normal phone log is what I'm struggling with…I'm quite used to just being a voice message or one click to put in a link. So in terms of extra workload, it is a bit slower than the patterns I'm used to"

"I found it a bit difficult to use the phone in my room, thinking that it would be like a distraction…I use to not use my phone, so just have it in my bag and check it at lunchtime…I talked to my supervisor, I just mentioned just in case he would see me using my phone, I'm always stressed about things like this".

On the other hand, others found the phone more useful than the web.

"The web is not as user-friendly, because my phone is there. I just go there rather than logging on to the website"

Some liked having it on both web and app and others would only use it on one

"Not that I think there's a disadvantage to doing it in one place and then looking at it on another platform, but if I put it in on the phone, I have this memory…It just seems a bit more continuity for my brain, rather than flitting between two places. I know it's all in the same place, but I just always used the phone in preference"

Some registrars had difficulty with IT issues, some of which weren't able to be remedied during the course of the research due to time and budget limitations. However this raises concerns with future learning and professional development, which will continue to have a strong technology bases, especially with Covid-19.

"The app itself is a little clunky"

"When you create a learning log and then you have the option to go into the note section and add notes, it doesn't let you"

"If you're writing a note in dot points…you can't do a next line on the app"

"It just wasn't user-friendly"

"I never successfully got the app going very easily, because apparently my phone has security issues and I could not resolve them to let the app let me open the learning logs on the phone. That was disappointing, because it would be a lot more fun that way".

"But then nothing happens, it just gets ticked and then you expect something to happen…Then you're really tempted to do the swiping thing, but if you swipe it, it removes the thing and then I don't know where it goes, but I think it's lost for good if you accidentally swipe them…You can easily accidentally delete it and if it was

something really important as well and you accidentally deleted it, that would be frustrating because there's no rubbish bin where you can get these things back"

Many registrars did not think the Priorities (Normal, High, Private) section was useful. Others however had suggestions for how the priorities could be improved.

> *"The priorities, I don't know if it really – I suppose it depends how many learning issues you have. If you've got an endless list…then you need the priorities for sure. I think generally though the registrar will know what their priority is."*

> *"I probably wouldn't use the private log"*

> *"I didn't really have a clear sense of priority when I was adding the log. So I guess my intention was to come back and look at that at some point, but it didn't happen"*

Some found the format too unstructured and would have preferred more guidance on what to write so that the learning issues could be better monitored. This theme emerged in particular when discussing examinations and a desire for registrars to have structured learning plans in order to cover the curriculum. However, to become life-long learners, registrars will need to be self-motivated and tailor any structure to their own learning needs.

> *"It's not formalising it in terms of what steps you would go to, to address this learning need, how long it will take to do, when will you review it, how you monitor, that sort of stuff, so smart learning goal stuff"*

> *"So you've gone grand, but it's a little bit narrow. So you've got lots and lots of things in there, but the depth in there is not so great"*

> *"But then at the same time, potentially all the simplistic, where what you do is write a title, click add and then you can just vaguely tick it off. It's hard to judge what you are getting from that. That's where the whole smart goals come into place…The other issue is if you've got these learning logs and you tick them off, how well did you actually learn it?...otherwise it's a click and forget type of issue, because it's so easy to enter them and tick them off"*

Most registrars found it frustrating that the reminder function could not be set on the web but could on the phone as they thought reminders were a good idea. Others did not like the idea of a reminder.

> *"The negative of using the website though, is you can't add a reminder."*

The comments reflect that there is a desire to have a personalised platform, but in some cases, a standard basic version would be preferred to minimise the amount of data entry required.

Discussion - what do your findings add/ contribute to the body of knowledge in the field?

This research suggests that the two main barriers to engagement with current learning plans could be: a need for flexibility to take in to account the diversity of learning approaches, learning needs and contexts; and for some registrars a more fixed mindset which lowers engagement with a need for self-reflective learning. Registrars identified that prospective learning was difficult and that their learning needs were influenced by their current patients and their exams. The cohort who volunteered for this research were likely to be skewed towards being more interested in new ways of thinking and exploring new ideas and so this research may not reflect the way all GP registrars learn. However even in this group, the above two barriers emerged as themes.

The fact that most registrars in this study chose paper rather than technology as a way of logging and tracking their learning in real-time during consultations, calls to question the use of technology as the main way that RTOs ask registrars to develop learning plans as assessments. It is of note, that CPD logging post-Fellowship is technology-based. Most registrars found the current learning plans were 'artificial' and 'useless' and this adds to the information from supervisors, medical educators and RTOs in the WBA ERG and the previous learning plan ERG that learning plans are not a useful assessment (GPEx 2019, Brown 2015). Some of the registrars articulated that they thought they were better able to learn if they wrote something down and held it in their hands rather than used technology. There is literature to support this as a more effective way of learning (Smoker 2009).

Most of the registrars in this study would fulfill the requirement of being a self-regulated, self-reflective learner who looked for feedback and were strategic about how they planned their learning. For some their goal was only to pass the examinations, but others looked beyond the needs of the exam or even the patient in front of them and had a thirst for learning and challenges that would carry them into the future. They acknowledged that this was something that had matured throughout their training and that they sometimes needed more structure and guidance at the beginning of training until they developed confidence. This included being self-assured enough to admit their own vulnerabilities and weaknesses.

The majority of registrars viewed the current mandatory learning plans as no more than bureaucratic tick-boxes that did not reflect either the content or the style of their learning. This is logical as a mandatory approach to self-regulated learning is paradoxical to say the least. However, self-reflection does not always come naturally and in order to be able to develop such a learning habit, exposure to the process and its possible benefits need to take place during training. This being said however, a gradual release of control may be more beneficial – for instance from mandating to nudging to self-regulating. This gradual handover of agency to the learners with respect to their own learning and assessment,

would open up the promising avenue for addressing some of the resistance against mandating self-reflection and self-regulating learning tools.

There was a wide variation in how registrars learnt in real-time during consultations and in their own time, but a recurring theme was the need for flexibility. Even the concept that learning plans should always be represented as SMART goals did not reflect the way that registrars always planned their learning, as sometimes they were specific and sometimes broader. Also sometimes learning was done best as part of a study group rather than as an individual.

Those registrars with a growth mindset valued the input of their supervisors and sought out feedback. They saw general practice as a challenge that often left them feeling uncertain and insecure. However, they embraced this as part of the complexity of their chosen specialty and saw learning as an 'adventure' and not a chore or a reflection of their own inadequacy as a person. It is this way of thinking that needs to be taught, assessed and encouraged in GP registrars if they are to become self-reflective life-long learners. After all, the external incentives, such as examinations and mandatory assessments, largely cease after passing Fellowship. Future development of skills in self-reflection might include training in how to develop engagement with the long-term need for learning over a broad base, rather than just focussing on day-to-day needs. The development of enough insight combined with self-confidence and the understanding that no-one can ever be perfect in general practice, will also assist in progressing registrars towards a growth mindset.

The RACGP PLAN activity outlined a 'systematic approach to reflective learning in line with international practices of learning plans' and acknowledged that 'learners may require a structure to support them when acquiring these skills, as well as feedback relating to content and the process of reflection' (RACGP 2017). However, at the time that PLAN was scrapped, there were discussions by the late Dr Harry Nespolon about the 'development of a more meaningful CPD agenda' because 'people practise in all sorts of different ways, and one-size-fits-all isn't going to work'. He talked about there being 'a range of activities people will be able to undertake to complete their self-reflection' and that 'It's got to be meaningful to members and something they actually get some value out of, rather than just ticking off something they have to do' (Lambert 2018).

The online learning plans currently mandated by most Australian RTOs are seen as 'tick-boxes' by most registrars, similar to the criticism of PLAN. A one-size-fits-all is not appropriate for the range of registrars and contexts in GP training and a more flexible approach is recommended, with baseline characteristics. This will include the offer of a structure for those who need it, and the option of on-line or paper-based tools. Building skills in internal motivation by having a growth mindset rather than a fixed mindset will ensure that registrars are learners with a deeper reflective ability, self-regulation and understanding of professional identity (Wolcott 2020). It is essential to train supervisors and medical educators in how to support registrars to have an optimal mindset, and how to be successful role models themselves of self-reflective life-long learning. This will also ensure a

safer learning environment, better collaboration and opportunities for more successful feedback.

Limitations

Many registrars exhibited characteristics from both fixed and growth mindsets and future research could explore ways of teaching and assessing skills in self-reflection and learning. Because the coding sheet was used on transcripts that did not specifically look for whether registrars had fixed or growth mindsets, many registrars had only a few questions in the growth mindset coding sheet that could be answered. Hence these results are only a guide to how registrars were thinking in general. Registrars with an obvious growth mindset still need to pass the exams and so also focussed on study guides, aide memoirs and study groups. But they also discussed the deeper motivating factors for the development of life-long learning skills associated with how they studied now.

This research only considered the registrar perspective. In designing a system going forward the supervisor, ME, RTO and College perspective are all important to understand- how do we meet everyone's needs.

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Implications - what is the wider impact of your research and what are the implications of your findings for policy and practice?

The development of skills in self-reflection cannot be either encouraged or assessed using the current mandated learning plans. As with the discussions when PLAN CPD activity was made optional, registrars should be given an optional structural template both online and on paper, but then a wide range of other options for presenting their ability to self-reflect and self-regulate. A possible alternative for assessing reflective practice in registrars should include a more flexible approach that takes into account the huge diversity of ways that registrars learn, their informal approaches to learning from consultations, and the reliance on paper-based learning logs rather than online.

Registrars should be trained in the how to have a growth mindset rather than a fixed mindset and encouraged to build a portfolio of ways of demonstrating this progression. Supervisors should be trained in how to be a successful role model for registrars regarding being a self-reflective, life-long learner.

Future research - outline areas for future research that your work identified

Further research needs to be done on how to best develop and assess growth mindset during AGPT training and how this can be sustained after graduation to enable life-long learning.

An online learning log tool seems to be supported in principle for use as an optional tool that may enable logging of authentic learning goals emerging from consultations. However, there are some clear requirements in terms of further development of such a tool. The current prototype would need to be amended and piloted to address the feedback from the research.

Further research should focus on how to assist registrars to develop and maintain the desired skills for self-reflection and self-regulation beyond the exams.