1 **Title:** Students' views on the sustained impact of a learning approach developed by

2 blending pedagogy to prepare for professional practice: introducing 'Daybook'.

3 **Abstract:**

4 **Introduction**

5 Daybook is an enquiry-based teaching and learning approach that blends various adult

6 learning theories. It is designed to equip and prepare a new graduate to do a

7 designated job in the workplace. It supports the safe beginner to undertake high-level

8 thinking that permits adaptation to unfamiliar challenges of the job, as well as use of

9 continuous learning strategies to do the job better. Its aim is to support four main

10 pedagogic pillars of learning: preparing for practice, educating for employability,

11 enhancing capability over competence and lifelong learning.

12 **Methods**

13 A study using three successive student cohorts evaluated the perceived sustained

14 impact of Daybook on learners' clinical practice following graduation and entry into

15 the workplace. Using a questionnaire with open ended, opinion and closed questions,

16 descriptive quantitative analysis was used on numerical data, and qualitative data

17 underwent a deductive thematic analysis.

18 **Results**

19 Quantitative and qualitative results supported one another to identify that the four

20 pedagogic pillars of learning were all impacted positively by use of Daybook. Enhancing

21 capability was the most influenced area. Each of the four areas, although discrete

22 academic entities, demonstrated overlap and commonality.

23 **Conclusions**

24   Although an academic exercise, Daybook is perceived to support users' undergraduate

25   learning across the four domains of educating for employability, preparing for practice,

26   enhancing capability and lifelong learning, and this impact sustains through the

27   transition from student to independent practitioner when they qualify.

28

Introduction.

"Daybook" is an innovative and authentic teaching and learning approach based on evidence based pedagogic principles. Daybook is used by final and penultimate year dental students at the University of Plymouth Peninsula Dental School. Students engage in enquiry-based learning (EBL) during the early years of their BDS programme, and Daybook is a spiralled extension of this EBL curriculum. Daybook is established in a socio-cognitive, constructivist paradigm and was created originally to enrich the learning experience for final year dental students. It provides an authentic, case-based resource founded in general dental practice on which to build their knowledge and expertise. Daybook was piloted in this first cohort of final year dental students in the Peninsula Dental School in the 2010/11 academic year, and was further developed for subsequent student cohorts after an extensive and multi-layered evaluation that included student and facilitator feedback, triangulation with assessment data and a critical review of the related pedagogic literature. This evaluation formed the project for the first author's PGCAP (Post Graduate Certificate in Academic Practice) qualification.

Daybook embeds resource, operational and logistical considerations as below:

- a student workbook containing narrative, graphics and images of multiple case information (10 cases per Daybook – 8 patient centred clinical, 2 non-clinical management, leadership and governance) is presented as a spiral bound A4 document. Studied over a seven or eight week period, it contains too much content for one student to cover sufficiently during that time
- an evidence based blended pedagogic approach

55   • content expert facilitators

56   • training, development and support network (student & facilitator)

57   • ongoing quality assurance components.

58   These theoretical and practical components interweave in its operation to create a

59   holistic teaching and learning approach, rather than just a physical resource. Daybook

60   differs to the more conventional EBL or PBL approaches used in the earlier years of

61   study, and across dental education more generally, in that it has multiple cases as

62   opposed to one, is run over an extended period of time, is dependent on student

63   collaboration, uses amalgamated educational theories and the facilitators are experts

64   in the field. These differences are discussed in more depth below.

65   *Pedagogic approach.*

66   The underpinning pedagogic approach amalgamates the current evidence-based adult

67   learning theories listed in table 1. Table 1 also highlights how the specific element of

68   each of the integrated theories is optimised in Daybook.

69   [Table 1 here]

70   This blended approach was developed following evaluation of the pilot project, to

71   enable Daybook to facilitate delivery of four overarching pedagogic pillars: educating

72   for employability, [12] preparing for practice, [13] enhancing capability [14] and encouraging

73   lifelong learning. [15] Table 2 provides a summary of these four areas to highlight why

74   these aims were deemed aspirational as curricula outcomes internally within

75   University of Plymouth strategies; national HE bodies, for example Advance HE

76   (formerly HEA); and within the regulatory guidance of the GDC for their professional

77   programmes.

4

78   [Table 2 here]

79   Previous EBL and PBL strategies have been reported to develop skills linked to lifelong

80   learning and preparedness for practice. A systematic review of the literature on the

81   effect of PBL on post-graduation competencies found strong positive correlation on

82   social and cognitive dimensions including self-directed continuous learning, i.e. lifelong

83   learning. [21] Another review of the literature found PBL has a positive effect on

84   students' preparedness and their confidence to practice dentistry. [22] The other two

85   pillars had not been linked explicitly to this type of learning, but further to the in-depth

86   evaluation of the pilot and exploration of the literature, it was proposed such an

87   enhanced Daybook approach could achieve this successfully. Use of Daybook is

88   intended to provide the newly graduated safe beginner with a way of high-level

89   thinking that not only prepares them for practice initially, but facilitates their ongoing

90   adaptation to the unfamiliar challenges of the job, as well as encouraging continuous

91   learning in order to do the job better.

92   *Resource, operation, logistics.*

93   Through blending of the pedagogies, students are guided to learn new knowledge;

94   deepen existing knowledge; reflect on individual knowledge construction; and

95   rehearse and apply knowledge in and for the workplace. To appreciate clearly how this

96   occurs, it is essential to embed the operational and logistical considerations of the

97   process and understand how these link to the combined pedagogies.

98   The physical resource called Daybook is a collection of multiple case scenario

99   information (clinical and non-clinical) provided in workbook style to simulate a day in

100   general dental practice. It is referred to by students in and out of the formal small

101   group learning space.

102   The cases are grounded in the reality of the primary care dental practice workplace

103   context and cannot be fantastical or fictitious. Writing the cases is a challenging but

104   imperative task and it is fundamental to have the expertise and associated insight of

105   an experienced practitioner. It is here that the authors' unique position of being

106   experienced primary care dentists as well as academically qualified and experienced

107   educators was indispensable. [23]

108   Students work with their dedicated and experienced small group facilitator (a general

109   dental practitioner, considered the expert) thus setting up their 'community of

110   practice'. [2,6,7] The dentist facilitators have to relate to the cases as real and likely, or

111   the essential component of authenticity from case-based learning is lost.[1]

112   Students have two full contact days with their facilitator at the beginning and end of a

113   pre-set period (6-8 weeks): one a Brainstorming Day and the other a Presentation Day.

114   Brainstorming (based on step 1 of the recognised EBL process) [24] activates and

115   encourages self-assessment of learners' prior knowledge base. The use of concept

116   maps connects explicitly their pre-existing knowledge, skills and attitudes [25] and

117   learners then decide what they need to learn and how they need to learn it [26] in order

118   to respond appropriately and safely to the scenario. They set group and individual

119   student-specific learning objectives that are considered prerequisite for the given

120   situation.

121   Students work on one or two allocated case scenarios independently before sharing

122   their work. Cases are then developed collaboratively in an online workspace accessible

123   solely to the group and facilitator. This enhances the community of practice element of

124   Daybook as outcomes and processes will vary between individuals and groups.

125   Students are accountable and responsible for their contributions and each individual

126   input is essential for the appropriate functioning of their community of practice. There

127   are deliberately too many cases in each Daybook and too much work for one student

128   to carry out in the time available. This leads them further into collaborative working

129   practices through processes including negotiation, agreeing deadlines and sharing

130   information. As such collaborative working is facilitated and optimised, so social,

131   psychological and academic benefits can be achieved, including greater productivity

132   than when each student works alone, the enhancement of higher level, critical thinking

133   skills, and development of interpersonal skills. [27, 28]

134   On Presentation Day at the end of the collaborative learning period, facilitators choose

135   which student will lead the discussion for each case (normally a random or 'luck of the

136   draw' process). The only rules being that no one is allowed to present the case they

137   prepared, and a maximum of one side of A4, Arial font 12 notes related to each case is

138   allowed as a prompt.

139   Throughout the Daybook process, learners are expected to give and receive feedback,

140   and to self and peer assess. At the end of Presentation Day, and in line with other EBL

141   approaches, learners are given dedicated time with their expert facilitator in order to

142   give a written self-reflective assessment related to knowledge, impact on their team,

143   areas in need of improvement and engagement across the entire process. They also

144   receive their expert's assessment relating to these areas with one to one verbal and

145   written feedback.

146 Feedback is regarded as an essential teaching activity [29, 30] and is embedded implicitly

147 into each of the pedagogies incorporated into Daybook, as well as into this assessment

148 space explicitly. Self-assessment is a fundamental part of being a reflective practitioner

149 and being able to reflect on-, in- and for-action [31, 32] is considered essential for

150 successful professional practice as well as self-directed life-long learning. [33] The self

151 and peer assessment on top of an expert assessment enhances the assessment-for-

152 learning or 'learning from doing' ethos that is developed implicitly through Daybook. [34]

153 Authentic and contextual tasks incorporated into Daybook enable learners to

154 demonstrate synthesis, rehearsal and simulated application of knowledge. Tasks are

155 akin to those completed by practitioners every day (such as making referrals, writing

156 clinical notes, talking to patients) in order to optimise the benefits of the incorporated

157 work-based learning element. [9,10,11] The student is aware the situation is simulated,

158 and as such is a training exercise within their Community of Practice. Coupled with

159 self-reflection, this supports their understanding of how they might approach similar

160 and different situations effectively in the workplace. [35, 36]

161 The Daybook process again differs from generic EBL in that it takes place over a longer

162 period; learning is divided and shared; and tasks (often time limited) are performed

163 and assessed by self, peer and expert, to reveal learners' ability to situate, adapt and

164 cross-reference their learning.

165 *Expert Facilitators.*

166 Fundamental to Daybook success is that facilitators are experienced primary care

167 dental practitioners AND that they are exceptional facilitators of learning, not

168 'teachers'. They need support to facilitate EBL style learning as well as understand the

169   underlying educational theory and approach of Daybook; encouraging them to

170   facilitate for process over outcome thinking. They may not have had access to

171   educational training previously, and input into the premise of Daybook before they

172   start to facilitate is imperative.

173   Professional socialisation of students starts in Higher Education through the process of

174   teaching and learning. [37] Where facilitators are able to engage fully with the Daybook

175   scenarios, role modelling is encouraged through authentic reflection by the facilitator

176   on their own practical experiences. [38]

177   *Training, development and support network.*

178   Facilitators have access to an initial induction and training package, and thereafter

179   annual training days which develop pedagogic knowledge and expertise. Students are

180   provided with an induction programme when they make the transition from EBL to

181   Daybook and the first Daybook case is a team building exercise set in the practice

182   environment, which further supports the development of their new Community of

183   Practice. Educational mentors are available for facilitators and thorough administrative

184   support underpins the process and logistics.

185   *Quality assurance (QA).*

186   QA relates to both facilitators and the Daybook workbook resource itself. Facilitator

187   training, mentoring and peer review is available with individualised support and

188   feedback. The resource itself is subject to ongoing student feedback, annual content

189   review and student evaluation (elements of which have been presented at an

190   international conference). [39] The content review enables the authors to keep abreast

191   of changes in policy & practice, literature & evidence, governance & guidelines.

192   Anecdotal feedback triangulated with formal assessment outcomes demonstrates

193   students passing their final year assessments in knowledge, professionalism and

194   clinical domains, citing Daybook as their support. Additional, overwhelmingly positive

195   feedback from users (as in the unsolicited email quote below) suggested that it was

196   also supporting their initial move into their independent clinical practice and having a

197   sustained impact.

198   *Hi Sally. After my first few weeks slowly adjusting to the real world of GDP dentistry*

199   *something occurred to me and I hesitate to say it after my often outspoken anti-*

200   *Daybook comments last year.…. Daybook has prepared me for DF1. The past two days*

201   *alone I've had the complaining patient, a patient ringing to talk about a root-treated*

202   *molar which was deficient and asking why it "wasn't done right in the first place", the*

203   *patient with coronal root fracture of an incisor which required me to make a bisacryl*

204   *tooth chairside, the patient who was concerned about suspected leukoplakia and SCC,*

205   *the patient who was asking questions about the stages of orthodontic treatment, and*

206   *the patient who in their mid-40s had severe chronic perio and needed me to explain*

207   *every aspect of their disease. Each of these was in the Daybook last year and that has*

208   *well-prepared me for these past few weeks. Without the Daybook I would've found*

209   *these situations more difficult than they already were!*

210   *Oh, and I forgot the patient who was making a scene in the waiting room, asking why I*

211   *couldn't see him, even though we hadn't booked an appointment with him. That was*

212   *an interesting, and diplomatic, talk! Again – Daybook!"*

213   Anecdotal feedback from Dental Foundation Trainers has also been positive *"Sally, I*

214   *have to say [name] is the best DFT I have ever had. Peninsula is doing a great job of*

215   *preparing their students"*. A member of staff commented, *"I am using your Daybook to*

216   *revise for my MJDF – they're brilliant!"*

217   Daybook has been recognised as a best practice and innovative resource (University of

218   Plymouth Periodic Review 2018) and receives much unsolicited highly positive

219   feedback.

220   The authors received ethical approval for a more formal retrospective evaluation to

221   explore ex-students' views of the sustained impact of Daybook on their everyday

222   clinical practice following graduation, in relation to the four underpinning pedagogic

223   pillars of lifelong learning, employability, preparing for practice and enhancing

224   capability.

225   The aim of this paper is to introduce the Daybook methodology to professional

226   educators, and report students' perceptions of its impact.

227   **Method.**

228   An online SurveyMonkey© questionnaire hyperlink was sent to graduated students in

229   an email introducing the study, from three successive cohorts of graduates – 2013,

230   2014 and 2015. Criteria for inclusion were that individuals were still on the General

231   Dental Council register as dentists, and currently practising.

232   Quantitative and qualitative responses were sought using ordinal scale opinion

233   questions (scale of 1-10, where 1 was the least and 10 the most) and open text

234   questions. No personal data were requested from participants meaning respondents

235   could only be identified in relation to the cohort they studied in. Demographic data:

236   year of graduation, gender, work pattern (full time/part time) and current clinical

237   governance structure worked in (NHS/private/mixed) were collected to support

238   analysis and consider potential bias or significance of responses.

239   The questionnaire explored the sustained impact of Daybook on clinical and

240   professional areas associated with successful practice and related healthcare

241   education domains. Table 2 has explained each of the domains; table 3 shows survey

242   questions; and table 4 describes how each of the quantitative questions relates to the

243   educational aims.

244   [Tables 3, & 4 here]

245   The questionnaire was developed by the authors with two graduated students and

246   piloted on a small group of then current final year students using Daybook, so as not to

247   reduce the potential participant pool. Questions were devised by cross referencing to

248   specific areas in the literature related to each of the pillars including the authors' other

249   works on preparing for practice and capability, [13, 14] as well as the appraisal of the

250   literature that had supported the initial blending of pedagogies related to the Daybook

251   process (table 1).

252   The questionnaire was sent out electronically with all participant information, consent

253   forms and an introductory email. Personal and publicly available contact details were

254   used, and follow up, reminder emails were sent after 1 month and 6 weeks.

255   Quantitative data were analysed using SPSS$^{©}$ software (v 21.0) to deliver descriptive

256   statistical results relating to using means and standard deviation. Although the data

257   collected was ordinal, use of means and standard deviations has been shown to be

258   appropriate in medical education research such as this. [40]

259   Qualitative data were thematically analysed deductively, in an iterative process of

260   descriptive coding and recoding of the free text responses, until all data had been

261   included and until saturation had been achieved. [41] Deductive coding was completed

262   using a priori theme codes relating to employability, preparedness for practice,

263   capability and lifelong learning (see tables 2 and 4). Coding was completed individually

264   and then collaboratively by all researchers (including two graduates from one of the

265   cohorts studied) and unanimous agreement reached in all themes. The four pedagogic

266   pillars initially identified thorough various sources as important curricula objectives,

267   are closely linked conceptually. When disagreement or conflicting opinions occurred,

268   these were resolved by cross referencing to key texts, and agreeing a 'best fit'

269   approach.

270   Quantitative results were cross-referenced with the qualitative findings to reach

271   conclusions about the impact of Daybook within each of the four pedagogical domains

272   of interest.

273   Ethical approval was granted for this study by the Research Ethics Committee - Faculty

274   of Health & Human Sciences and Peninsula Schools of Medicine & Dentistry (*15/16-*

275   *576).*

276   **Results.**

277   The potential participant pool consisted of 147 dentists, registered with the GDC and

278   working in practice. Due to data protection and ethical constraints, sampling was

279   limited to those for whom personal or publicly available contact details were available.

280   This resulted in a slightly reduced potential participant sample of 123. There was a

281   17% response rate (n=21), which was evenly split across the three cohorts and with an

282   even gender split (10 female: 11 male). The responses represented all demographic

283   groups, with none of the areas showing significant impact on the findings.

284   Table 5 shows respondents reported confidence in all four educational areas due to

285   the use of Daybook, with all means above 5, suggesting a midpoint between none (0)

286   and full (10) confidence.

287   The higher means and reduced variation in scores relating to capability suggest that

288   users of Daybook feel more confident in this than the other areas; while time

289   management, as attributed to educating for employability, had the lowest mean and

290   therefore lowest confidence, although this was variable and less consistent between

291   respondents as noted by the relatively wide standard deviation.

292   [Table 5 here]

293   Analysis of the qualitative data in the free text boxes showed strong associations

294   across the four pedagogic pillars, used as a priori codes.

295   An overarching commonality in the data related to a *"holistic"* approach to *"treating*

296   *the patient and not the teeth"* that Daybooks encouraged.

297   The four individual themes are described further below.

298   *Preparing for practice.*

299   The data showed that learning through Daybooks was a challenge as some of the

300   scenarios seemed extreme to students at the time, but in reality, were an authentic

301   foundation from which to move from student to independent practitioner. There were

302   numerous examples of data that showed how Daybooks prepared students to cope

303   with the complexity and challenges in practice summarised in the quote below.

304   *"At the time, Daybook days felt like 'a day from hell' but I now see it was*

305   *preparing us for the worst-case scenario and I feel confident approaching*

306   *challenging or ethically demanding cases".*

307   *"I felt more prepared to cope holistically with situations and nothing shocked*

308   *me since the Daybooks were usually worst-case situations".*

309   Furthermore, the interplay of the various dilemmas in Daybooks permitted the

310   students to link and conceptualise the complexity of their learning, thus preparing

311   them for the intricacy of dental practice;

312   *"Daybooks was a way of learning from patient led examples which is true to*

313   *real life dentistry which is multifactorial and not just one subject matter".*

314   *Educating for employability.*

315   So, whilst Daybooks prepared students for real-life practice, they also appeared to

316   support them further whilst in the workplace. Users return to ideas learned in

317   Daybook when faced with challenging situations;

318   *"I return to the Daybook process during daily practice. Particularly in regard to*

319   *managing difficult professional scenarios and coping with busy days".*

320   One respondent reported being equipped to handle challenging circumstances that

321   without learning through Daybook may have been more problematic for them;

322   *"I feel that Daybook not only helped me to do dentistry, but to be a dentist in*

323   *practice from the start …..with all the real life issues that you wouldn't normally*

324   *even think about before you got out there into it".*

325   *Enhancing capability.*

326 Daybooks appear to have augmented students' ability to cope in situations they had

327 **not** encountered before, thereby demonstrating capability to manage these unfamiliar

328 situations.

329   *"I felt prepared managing complicated patients in practice having done*

330   *Daybooks".*

331   *"A lot of the cases covered in Daybooks presented in practice and hospital*

332   *which gave me the confidence to approach and manage them in a logical and*

333   *calm manner".*

334 Use of Daybooks enhanced individual's self-efficacy when faced with unfamiliar or

335 challenging scenarios, as well as reinforcing the need to integrate multiple

336 competencies and adapt to the specific situation.

337   *"I appreciate that difficult days can occur, but that problems can be solved".*

338   *"Helped me look at things holistically, realise every patient is different and not*

339   *try to keep everything separate".*

340 *Lifelong learning.*

341 The breadth of the case scenarios in Daybooks appear to have given students an

342 appreciation of how to underpin their knowledge acquisition in the future. The

343 questioning and requirement for evidence-based information in Daybooks seems to

344 have instilled a predisposition for lifelong learning;

345   *"The type of cases we were given in Daybook helped me to know where to go to*

346   *fetch latest info or update, where to read on something in particular and what*

347   *resources to use."*

348   The following quote further demonstrates how, as a student, it is difficult to see how

349   different learning methodologies may play a part in your continued professional

350   development, and that it is only after some time after graduation, that one can look

351   retrospectively and see the benefit of them.

352   *"When you are studying you only have a very small part of the picture. Having*

353   *now been working for a couple of years I understand the thought process*

354   *behind daybook, and more fully appreciate its use as an educational tool".*

355   During analysis it became apparent that many of the individual responses were

356   relevant across two or more of the a priori codes, as demonstrated in the comment

357   below.

358   *"The daybook process left me mentally equipped to walk straight into practice.*

359   *The scenarios had me thinking as a qualified dentist long before I had*

360   *graduated and enabled me to approach issues in practice in a realistic and*

361   *logical manner".*

362   **Discussion.**

363   From a simplistic viewpoint Daybook could just be seen as a series of cases used as a

364   case-based learning resource that facilitates knowledge acquisition and permits a

365   degree of rehearsal prior to the real world of clinical practice. However, the findings

366   demonstrate that Daybook has a more meaningful and sustained impact to the users.

367   In line with the underpinning ethos of the four underpinning pedagogic pillars, using

368   Daybook supports an active ongoing development process over and above the 'instant

369   gratification' outcome of learning a new fact or skill. The four areas of educating for

370   employability, preparedness for practice, enhancing capability and lifelong learning are

371   areas that are considered fundamental to outcomes of Higher Education. It may be

372   difficult for students to grasp the relevance at the time of using Daybook as it may not

373   be apparent how it is supporting them in gaining their qualification, and this highlights

374   the importance of the need for associated workplace based and authentic assessment

375   strategies. [10, 34] At the time of use, Daybook might have seemed an extreme version of

376   reality, but with hindsight, this approach to learning was deemed to have supported

377   the users far beyond their undergraduate experience. Similarly, enhancing capability

378   may not be valued by learners at the time of learning because they are unconsciously

379   unaware of the unfamiliar challenges they will face in the workplace. It is interesting to

380   note this was the educational area reported to be the most distinctly impacted by

381   Daybook. The authors feel this is due in part to their longstanding experience as

382   clinicians, leading them to write Daybook cases that were not only authentic but had

383   conceptual elements embedded in them which unconsciously established

384   underpinning principles to enhance their transfer to unfamiliar situations.

385   Because the four pedagogic areas, although artificially used as discrete entities, share

386   this underpinning approach of ongoing development over and above skill or

387   knowledge acquisition, many of the areas that support one will support one or more of

388   the others. Within this paper we have referred to them as clearly defined separate

389   areas, but the findings have reinforced their mutual interplay and the blurred

390   boundaries between them.

391   As the results noted time management was the area that participants reported being

392   the least confident in due to the use of Daybook. Time management is a fundamental

393   part of dental practice but not one students are overly concerned with. Use of

394   Daybook may not specifically support their development in this area and is something

395   for the authors to consider when reviewing the Daybook process, for example, by

396   structuring contact days and time limited activities more explicitly. It is also important

397   to reinforce that Daybook is an academic resource that works in conjunction with

398   clinical training to optimise learning, and is not a replacement for it. The authors

399   recognise there are many confounding factors in asking the questions about impact of

400   a teaching and learning resource retrospectively in this way, especially when the

401   curriculum in which is it is incorporated is integrated with a variety of teaching and

402   learning experiences as well as clinical training. Additionally for students 4 years post-

403   graduation, experience in the real world of practice will have influenced their

404   confidence levels perhaps unconsciously. On the other hand, the similar results noted

405   across all the different cohorts, the use of the free text questions prior to the

406   individual numerical questions, and the fact that Daybook plays such an explicit and

407   significant role in their undergraduate training, would optimise their ability to focus on

408   the impact of Daybook in their responses.

409   The authors acknowledge the low response rate raises questions about the validity of

410   the quantitative data. These do however, demonstrate alignment with the qualitative

411   findings, which provide support for the positive study findings, notwithstanding the

412   small sample size. Requiring the completion of separate consent forms in addition to

413   survey completion may have had a bearing on the small sample size, along with

414   problematic access to the study population, due in part to the reliance on potentially

415   outdated student contact details. Gaining access to previous students is an issue in the

416   HE sector in general when related to informing Longitudinal Education Outcomes (LEO)

417   (previously DELHI) data [*] and gaining access to students who completed their studies

418   up to 5 years previously proved difficult. The demographic data, however, showed

419   respondents equally from across the 3 cohorts studied (2013/14; 2014/15 and

420   2015/16), who were 2, 3- and 4-years post-graduation, which increases confidence in

421   the findings although the caveat relating to small sample size above remains relevant.

422   Additionally the small sample size may denote a sample bias, with only those users

423   who felt positive about the benefit of Daybook replying.

424   Previous evaluations of EBL and PBL methodologies have reported positive outcomes

425   related to lifelong learning and preparedness for practice via transferable skill

426   development. [21, 22] No studies have yet linked such approaches to enhancing capability

427   or employability explicitly. It has been explained clearly that Daybook is more than EBL

428   or PBL, and these findings may therefore not be generalisable to more limited generic

429   EBL and PBL approaches.

430   *Challenges of Daybook.*

431   There are challenges to running the Daybook process relating to financial, physical and

432   human resource implications. In the beginning, this was mitigated through sheer hard

433   work, vision and determination, on top of knowledge and skill. It is essential that the

434   cases are authentic and that the editor and/or authors have a deep knowledge of their

435   specific working sector. While set up costs may be a one-off, there are ongoing

436   resource implications for the Daybook methodology and although student and

437   facilitator feedback may be positive, it is a challenge to demonstrate the value of this

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[*] https://wonkhe.com/blogs/a-beginners-guide-to-longitudinal-education-outcomes-leo-data/

438   process over and above a cheaper alternative. As Daybook continued and existing

439   students had the feedback of previous graduates to encourage them that the hard

440   work was worth it, so faculty, facilitator and student engagement has continued to

441   increase. There is now a waiting list of clinicians who wish to become Daybook

442   facilitators. Keeping the resource contemporaneous and current through updating the

443   numerous cases with new policies and procedures has both time and scholarly

444   implications.

445   Most of these challenges are overcome through working to a solid pedagogic

446   evidence-base; managing and maintaining an excellent and committed team through

447   sensitive, inclusive and thoughtful communication and leadership; and having a

448   commitment to student-centred learning practices.

449   The authors hope that by sharing their experiences some of these challenges can be

450   alleviated for others who may wish to trial this methodology for themselves.

451   *Future Work.*

452   Comparison of students who have used Daybook and those who haven't may be

453   helpful to explore how and/or where Daybook learning has advantages or

454   disadvantages when compared to other methodologies.

455   Daybook has been introduced successfully into a Dental Therapy & Hygiene BSc

456   programme for final year students at our institution. It has been modified to relate to

457   their scope of practice, but the concept and methodology remain. Further work might

458   identify opportunities for transfer to other dental schools and further into different

459   vocational professional settings (e.g. nursing, medicine, midwifery, optometry, law or

460   teaching). Evaluation could investigate its impact across the remit of education of

461   professionals, and explore the proposal that although designed originally for dentistry,

462   the Daybook idea may be translated across healthcare and the vocational professions.

463   **Conclusions.**

464   Daybook is perceived to support users' undergraduate learning across the four

465   domains of educating for employability, preparing for practice, enhancing capability

466   and lifelong learning, and that this impact sustains through the transition from student

467   to independent practitioner when they qualify.

468   By utilising the blended methodologies of table 1, Daybook aims to facilitate more

469   than just the learning of facts and skills **or** the development of transferable skills that

470   may be gained by using one or more of the individual approaches independently.

471   This innovative, evidence-based approach may seem complex, but the blueprint

472   created here is straightforward to implement as long the appropriate knowledge and

473   resources are available. It is important to recognise also that there is much cross-over

474   between the four domains identified here, and incorporating this method into a

475   blended curriculum will give Daybook the best chance of having a positive and

476   sustained impact.

477   The term 'Daybook Day' has been coined to describe a particularly challenging day in

478   practice – and former Daybook users contribute much of their ability to deal with

479   these to the use of this resource within their undergraduate training.

480

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591

592 **Tables:**

593 **Table 1.** Educational theories and how they are optimised in Daybook.

Underpinning pedagogy	Optimisation in Daybook
Case based learning	Curiosity aroused through wanting to know how to manage scenario and authenticity of scenario. [1]
Small group learning	Enhancing equitable facilitated student-led discussion; self-monitoring; enhancing independent learning in a safe space. [2,3]
Collaborative learning	Interactive learning through cooperation (in contrast to competition); sharing authority and taking responsibility; respecting peers and their contribution; working toward a common goal or outcome. Reinforced through use of a shared digital workspace. [4]
Professional socialisation	Co-construction of knowledge between novices and experts so novices are socialised into a profession. Reinforced by having an expert dentist as facilitator. [5]
Community of Practice	Learning in a shared domain with a shared purpose and all having 'membership'. Each small group is independent from the others; digital workspace is only shared with specific group and their own facilitator. [6,7]
Problem Based Learning (PBL)	Brainstorming and concept mapping to activate prior knowledge; identifying gaps in knowledge; defining learning objectives; presenting new knowledge gathered through self-directed learning at a later date guided by a facilitator who does not teach. [8]
Work based learning	Presentation days and specific tasks to complete provide opportunity for formative feedback on professional activities; students are learning by, through and for work. [9,10,11]

594

595   **Table 2.** Educational aims of Daybook.

Employability is bigger than 'getting a job'. A complex area, it has been defined in a variety of ways when related to Higher Education. The Enhancing Student Employability Co-ordination Team (ESECT), funded through the joint Higher Education Academy (HEA) and Higher Education Funding Council of England (HEFCE), define it as: "*A set of … skills, understandings and personal attributes that make graduates more likely to gain employment and be successful in their chosen occupations*". [16] Employability is an on-going process of engaging with and developing critical reflection, evaluation and decision-making abilities. These enhance and empower the learner to effectively acquire and exhibit generic, in addition to discipline-specific, skills for self-management and career building, and ultimately to be able to use these practices in context. [16,17]	**Prepared for Practice.** While there is no accepted universal definition of being 'prepared for practice', the premise is that newly qualified professionals are able to go out and 'do the job' even though they lack experience. The General Dental Council (GDC)) define this as: "*working with autonomy within the GDC Scope of Practice, and own competence, once registered. This does not mean working alone and in isolation but within the context of the wider dental and healthcare team....*" [18] Preparedness for Practice may vary depending on the frame of reference within a specific profession, but the overarching concept of being able to 'perform a role' is the same, regardless of context.
Capability is about having the aptitude to perform a role effectively through the integration and adaptation of multiple individual competencies with higher order cognitive, personal and emotional processes and skills. Thus, enabling effective management of unfamiliar and challenging problems within the complex and ever-changing environment of professional practice. [14] "*Standardisation cannot cater for all possible circumstances and risks*" [19] and no amount of training will ever be able to provide rehearsal for all potential situations. Capability is therefore paramount in new professional graduates who are entering the workforce	**Lifelong learning** is the tenet of the reflective practitioner.[15,20] Professional practitioners need to keep abreast of technical, societal, personal and governance changes to enable their continued efficacy in line with contemporaneous ideas, laws and standards of their profession. Professional education programmes often sit within an additional regulatory framework that identifies and mandates assessment of regulator-prescribed competence-based learning outcomes. Learning, however, is a complex phenomenon that, in addition to achieving individual competencies, requires learners to have metacognitive strategies for process as well as outcome thinking. In order to optimise their own continued learning they need to be engaged with and knowledgeable about it, to enable them to continue such development throughout their careers.

596

597

598 **Table 3.** Survey Questions related to users' views on the sustained impact of Daybook.

Question	Response type
How you think using Daybook helped prepare you for being a dentist initially, or why it did not help? If you feel it had no impact please say "no impact"	Free text
In what ways you feel that using Daybook has impacted positively or negatively on your ongoing daily professional practice? If you feel it has had no impact in this regard, please say "no lasting impact"	Free text
In what ways do you feel differently about Daybook now you have graduated than when you were using it?	Free text
Due to using Daybook, when I am practicing independently, I am confident in my ability to ……. (see table 4)	Select a number between 0 and 10 (0 being not at all confident and 10 being completely confident, with no apprehension)

599

600 **Table 4.** Areas investigated in the quantitative questions related to educational aims.

Question number	Educational aims	Question. When I am practicing independently, I feel confident in my ability to….
1	Educating for employability	…effectively manage my time (this could include a busy day in practice including unplanned emergency appointments)
2	Educating for employability	…effectively manage challenging or unfamiliar problems in familiar environments with clarity, composure and creativity
3	Preparedness for practice	…make evidence-based decisions relating to individual clinical procedures on specific patients
4	Preparedness for practice	…overcome and manage familiar problems in familiar environments by applying existing knowledge and experience
5	Enhancing capability	…effectively manage unfamiliar situations in unfamiliar or new environments by applying existing knowledge, experience and creativity
6	Enhancing capability	…learn from others
7	Lifelong learning	…successfully critically reflect on my practice, identify my own learning goals and effectively plan my CPD
8	Lifelong learning	…understand my limitations and seek help where necessary

601

602 **Table 5**. Descriptive statistics related to four educational areas.

	N	Minimum	Maximum	Mean	Std. Deviation
Employability_1	19	1	9	5.05	2.614
Employability_2	19	1	10	6.42	2.835
Preparedforpractice_1	19	1	10	7.00	2.285
Preparedforpractice_2	18	2	10	6.78	2.390
Capability_1	19	5	10	7.89	1.286
Capability_2	17	7	10	9.06	1.197
Lifelonglearning_1	19	1	10	6.74	2.232
Lifelonglearning_2	19	1	10	6.05	3.045

603

604   **Data Availability Statement:** The data that support the findings of this study are available

605   from the corresponding author upon reasonable request.