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Learning through clinical extramural studies: an observational study

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Abstract

Background Veterinary medicine programmes require students to learn in formal educational settings and through workplace experiences. Previous studies have indicated that learning in the clinical workplace can be informal as students participate in daily activities of service provision by veterinary teams. It can be complex however for students to transition from a traditional formal educational setting to learning in the workplace and students must be able to self-regulate their learning. This requires students to set their own learning goals, consider available learning opportunities and to evaluate if intended learning outcomes have been attained. There is a need to identify strategies students undertake to self-regulate their learning in the workplace to design supports to enhance their learning. The aim of this study was to provide a detailed description of how final year veterinary medicine students plan, learn and reflect on their learning in the workplace context of clinical extramural studies (CEMS) prior to the COVID-19 pandemic.

Methods An observational repeated cross-sectional design study was conducted with two groups of final year veterinary medicine students in University College Dublin. Data was collected in two stages by analysing student activity records and surveying students in 2017 and 2018. Participants were asked to describe how they planned their CEMS, to describe the types of learning activities they participated in, and describe their reflections of CEMS.

Results The results are interpreted through the lens of self-regulated learning theory. Analyses of student CEMS activity records indicate that students from both groups primarily participated in small animal / production animal or mixed practice work placements. The majority of respondents of the survey indicated that CEMS was a valuable learning opportunity and they were motivated by placements that would support their future career goals. Financing CEMS placements was a key obstacle to their planning. The majority of respondents indicated varying frequencies of engaging in different types of learning activities and noted that finding suitable placements that facilitated practical skill development and active student learning was a challenge. Implications for veterinary education are discussed.

Conclusions Student perspectives on planning and learning in the CEMS workplace context yielded important insights into the factors that influence their self-regulatory activities which can help inform future educational interventions to support student learning.

Keywords Clinical extramural studies, Workplace learning, Self-regulated learning

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Background

Workplace learning (WPL) is an important and essential component of a veterinary medical programme as it offers students the opportunity to learn in an authentic real-life work environment, which can assist them to develop their identity as they transition into the veterinary profession [1, 2]. It can be delivered through diverse settings that include off-campus experiences undertaken

on farms, first opinion veterinary practices, or through on-campus intramural experiences in a referral hospital setting. Scholz [3] argues that WPL if considered through a social practice lens can provide students with opportunities to learn about the complex interrelationships that occur in veterinary practice. WPL can support students' appreciation of veterinary professional working life, guide their future career choices [4], help them to develop their competencies to manage challenging situations [5], and to apply disciplinary knowledge acquired during formal education [6].

Learning in the workplace however can be challenging for students as veterinary practices need to prioritise services and everyday work activities, therefore learning can become complex and multimodal [7]. Much of the current literature on workplace learning pays particular attention to its informal and opportunistic nature [8-11]. Eraut [8] explains there are four main types of workplace activities that support learning: participation in group activities, working with colleagues, tackling challenging tasks, and working with clients; and highlights that outcomes can depend on contextual factors (allocation of work, relationships with people at work, expectations of role) and learning factors (challenge, feedback and support, confidence and commitment). These activities can be challenging to facilitate given the role of the clinical teacher in the workplace who must balance student learning and patient welfare [12].

To overcome the challenges of WPL, an important educational component for a veterinary medicine curriculum is to foster students' ability to self-regulate their learning (SRL) to be able to capitalise on the informal learning opportunities available in a work context [13, 14]. According to Zimmerman [15] SRL is defined as "*the self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals*", (p14). The literature in SRL highlights several phases and constructs that encompass a learner's ability to regulate their learning: planning, learning, assessment and adjustment [16], and several models of SRL have been developed to explain this complex learning process [17]. White's model of SRL [16] describes how students set their own learning goals during the planning SRL phase. These goals can be influenced by multiple factors such as the student's confidence and belief in their abilities, and the social environment through which learning takes place. During the learning phase of SRL students seek out learning opportunities to reach their intended goals and they will adjust their learning strategies if required. Students monitor and assess their learning progress during the assessment phase, determining if goals are reached by seeking external feedback where necessary or through self-monitoring processes. These activities will inform the student's adjustment SRL phase by helping them to critically reflect on past learning experiences and to modify future learning plans. These processes encompass the metacognitive, cognitive and behavioural aspects of learning [18]. The development of SRL is considered an element core to development of lifelong learning skills [19] a day-one competency defined by regulatory bodies of veterinary medical programmes worldwide [20, 21] and framework for veterinary competency-based education [22]. The veterinary profession is continuously changing and practitioners are required to keep up to date in medical advances, diagnostic techniques and patient care to meet stakeholder and society's needs [23]. Veterinary students must develop their SRL processes to ensure they are able to continue and succeed in their journey of lifelong learning [24]. CEMS provides a valuable opportunity for students to commence this process at an early stage of their veterinary education.

In this context, there is a need to examine what activities students undertake to plan their CEMS and learn while on placements in order to develop evidence-based interventions to support their learning and development of SRL competence.

Study context

At University College Dublin (UCD), School of Veterinary Medicine students on the five-year school-leaver (MVB) and four-year Graduate Entry (GE) veterinary medicine programmes undertake 24 weeks of work placements outside of UCD, referred to as CEMS, in the clinical years of their programme. CEMS is a co-curricular activity and a programme requirement that aims to support their studies, where in the final year they complete intramural rotations in the University Veterinary Hospital or in first opinion practices (e.g. The Dublin Society for Prevention of Cruelty to Animals). WPL has a long tradition in veterinary education in Ireland, United Kingdom and Australasia where it is known as CEMS and in Europe where it is most commonly known as *external practical training*. In Ireland, students must complete 11 core weeks in different practice types, for example small animal practice and equine practice. The remaining 13 weeks can be completed in any combination of the student's choosing. Students are encouraged to consider a variety of veterinary sectors of employment to experience different learning opportunities, for example undertaking placements in a laboratory, contributing to a research project or attending conferences. Placements must be completed outside of the UCD academic trimester during Christmas, Spring and Summer breaks.

The aim of this study was to describe where final year students at UCD planned their CEMS placements, and to investigate their planning and learning strategies, and

reflections about CEMS. The objectives of the study were to:

1. Examine the types of placements students completed for CEMS;
2. Describe strategies students adopted to plan their CEMS and what obstacles they faced;
3. Describe the frequency of engaging in learning activities on CEMS;
4. Describe student self-assessment of how CEMS supported the development of their day-one competencies and their future employability and their reflections on CEMS overall.

This study was conducted as part of an educational design research project [25] being completed for a doctoral thesis that is investigating interventions to promote students SRL on CEMS. Data was collated prior to the emergency transition of higher education to online learning due to the COVID-19 pandemic in 2020. CEMS was subsequently impacted by lock-down measures directed by government public health guidelines, for example the number of CEMS weeks was reduced and various concessions were made for student learning. This study gives insights into student learning on CEMS before the COVID-19 pandemic occurred, therefore it does not explore the impact of COVID-19 on student learning on CEMS.

Method

An observational repeated cross-sectional study design was conducted with final year veterinary medicine students in UCD from the MVB and GE programmes in 2017 and 2018. Characterised by Cohen [26] a cross-sectional study provides a snapshot of a population at either one or two points in time. A repeated cross-sectional design [27] facilitated the retrospective exploration of student CEMS experiences with two independent samples over a two-year period. Data for this study was gathered using two methods, first student CEMS activity records were analysed to describe how students planned their CEMS placements by type, second an online student survey was conducted to explore SRL activities on CEMS. This study met the criteria exempting it from full ethical review from the UCD Human Research Ethics Committee—Sciences (Exemption Reference Number LS-E-17-Cashman-Doherty).

Student CEMS records from 2017 and 2018 were analysed in Microsoft Excel [28] (v15.4). Records were de-identified by replacing direct identifiers with a unique random identifier. A questionnaire was developed in an online format using SurveyMonkey [29] for ease of distribution and data collection. All final year students registered to the MVB and GE programmes were invited to participate in the study by email in March 2017 and March 2018 with no incentivisation. Two reminder emails were sent. Information regarding the aims of the study and participant confidentiality was provided. All responses were voluntary and anonymous. Analysis of the survey data was conducted on the aggregated data set from both samples. SPSS Statistics (v26) [30] was used to screen the data and to conduct descriptive statistical analyses of the quantitative data. Qualitative responses were hand coded using Microsoft Excel and thematic analysis was used [31, 32] to categorise the responses into themes.

Questionnaire instrument

The questionnaire was adapted with permission from a previous survey conducted by the Royal College of Veterinary Surgeons (RCVS) with students in the UK about their EMS experiences in 2014 [33]. This questionnaire contained questions regarding planning and self-assessment processes of SRL that were adapted and expanded upon to meet the aims of our survey. A key difference between both questionnaires was that RCVS collated data for pre-clinical and CEMS experiences while our survey would only focus on CEMS. The RCVS questionnaire asked questions relating to how students booked their EMS, reasons why all placements of choice were not found and the location of placements. These questions were adapted into our questionnaire to explore the planning phase of CEMS. The RCVS questionnaire aimed to explore how EMS learning experiences related to professional skills, knowledge and clinical skills compared to their core university studies. While our survey did not seek this comparison the Likert-scale statements were used and developed in our questionnaire to capture student SRL learning activities on CEMS and their overall reflections on how CEMS supported the development of their day-one competencies. Specifically, our questionnaire contained five sections that contained Likert-scale and open-ended questions were designed to collect data regarding demographics and four phases of SRL: planning, learning, assessment and adjustment.

1. Demographics: Programme of study, age, gender, and home country.
2. Planning CEMS: Rate on a five-point Likert scale the factors that influenced their choice of placements; indicate how they identified placements from a ten-item list (strategies not identified could be recorded in an open-ended question), indicate from a list what obstacles (if any) prevented them from doing any

placements; indicate how they financed different placement types.
3. Learning Activities on CEMS: Rate on a five-point Likert scale how frequently they participated in a list of learning activities on placement. These activities incorporated processes related to multiple SRL phases, for example discussing learning goals, observing a veterinary practitioner, seeking guidance, reflecting on previous tasks.
4. Assessment of Learning Experiences: Rate on a five-point Likert scale how they perceived CEMS supported the development of day-one competencies and understanding of veterinary professional life; 17 statements were provided for participants to self-assess their learning on CEMS.
5. Reflections of CEMS: Rate on a five-point Likert scale six statements regarding the perceived value of CEMS to support employability and relevance to their studies, indicate their overall experience of planning their placements. An open-ended question sought feedback on how CEMS could be improved.

Additional questions were asked of participants who indicated they completed a conference, laboratory or research placement; a further four questions sought data regarding the procedures, species and techniques seen on CEMS only, and opinions regarding the ePortfolio technology used for CEMS. Due to the size of the dataset those results are not reported in this paper but will be reported in a doctoral thesis.

Results

CEMS student activity records

Student CEMS records were analysed from two final-year student cohorts in 2017 (MVB $n=84$, GE $n=38$) and 2018 (MVB $n=71$ and GE $n=23$). Some records were excluded from analysis (2017 $n=1$; 2018 $n=4$) due to individual student registration circumstances, for example a student taking a year out. Table 1, shows how students allocated their weeks across these requirements noting 54 students in 2017 and 55 in 2018 completed more weeks than the required minimum of 24. The average number of weeks completed by students in 2017 was 25, the maximum undertaken was 32 weeks, compared to 2018 the average was 24.8 weeks and maximum 30 weeks. The majority of weeks completed by MVB students in 2017 (39.3%) and 2018 (38.6%) was in production animal / mixed practices. In 2017 over 40% of GE students completed their placements in small animal practices compared to 45.2% in 2018. The GE cohort completed more placements (2017 = 2.1%; 2018 = 3.7%) that were categorised with a primary focus on exotics compared to the MVB students (2017 = 0.9%; 2018 = 0.3%).

Survey

There were 35 responses to the questionnaire from 128 students who were registered to final-year in 2017, while 48 responses were received in 2018 from 104 registered final-year students. Questionnaires that were less than 50% complete were excluded from analysis. Therefore 30 responses from the 2017 group and 42 responses from the 2018 group were analysed representing a response rate of 23% in 2017 and 42% in 2018. Data from both samples were merged and analysis was conducted on the aggregated data set. The final study sample consisted of 72 participants (69% female, 1 respondent did not disclose) with 72% aged between 20–24 years. 78% were registered to the MVB 5-year programme and 74% indicated their country was Ireland, while 15% noted Canada or USA.

Planning CEMS

Factors influencing CEMS placement choices

The majority of respondents rated four factors as *important* or *very important* when planning their CEMS, these included placements that: (i) may be beneficial to their future veterinary career (94%), (ii) provided experience of a discipline of possible future employment (94%), (iii) were affordable to complete (83%), and (iv) build a professional network (62%). 50% of respondents rated it was either *important* or *very important* that placements were located close to home. The results showed that selecting placements that support specialisation post-graduation was varied, 40% rated this factor as *important* or *very important,* while 22% indicated this was not *important.* Responses varied regarding travelling abroad as a factor that influenced their placement choice, 29% were neutral about this factor, while 39% considered this either *important* or *very important*, 32% considered this *not important* or *somewhat important.* Similarly, responses to complete placements as quickly as possible varied, 55% rated this factor as *not important* or *somewhat important*, while 32% were *neutral* about this factor. 59% of respondents noted that it was *not important* to complete placements with friends.

Strategies to find a CEMS placement

The top three frequently selected strategies used by respondents to find suitable placements were: (i) approaching a practice they knew (93%), (ii) liaising with peers for recommendations (68%), and (iii) searching the Internet (63%). Respondents infrequently used other methods such as: consulting the UCD CEMS past providers list (17%), searching specific veterinary websites (15%), or following up on communications from email or social media posts (11%). Only three

Table 1 Percentage of weeks spent by students on CEMS by placement type

Year	Programme	Number of student records analysed	Small Animal Practice	Production Animal / Mixed Practice	Equine Practice	Meat Plant	Laboratory	Exotics	Other	Total number of CEMS weeks completed by students
2017	MVB	84	33.8%	39.3%	16.6%	4%	1.9%	0.9%	3.5%	2097.7
2017	GE	38	41.8%	25.7%	14.7%	4.1%	4%	2.1%	7.8%	936.4
2018	MVB	71	33.7%	38.6%	17.3%	4%	2.8%	0.3%	3.2%	1781.8
2018	GE	23	45.2%	25.6%	11.8%	4%	1.6%	3.7%	8.2%	575

respondents referred to UCD notice board posts, the VCI or RCVS register, or the CEMS student handbook. Other strategies identified in an open-ended question (n = 6) included: reviewing student-led message boards mainly based in the United Kingdom, consulting with family friends who were veterinarians, networking with veterinarians at conferences, word of mouth, and finding placements where accommodation could be secured in advance.

Obstacles to planning CEMS

Participants were asked to select from a list of obstacles they encountered when planning, if any. Table 2 provides the responses from 72 participants. The top two obstacles while planning CEMS were: (i) placements that respondents wanted were already booked (44%), and respondents could not finance placements they wanted (40%). 33% of respondents indicated however, they were able to get all the placements they wanted, which was the third highest selected option from the list. 19% of respondents indicated they took placements in a geographical area they wanted, while 17% selected they took placements they could secure. Seven respondents noted further or reiterated obstacles in the open-ended comment: cost and financing, not receiving email responses from a practice, visa issue, not having a list of potential practices outside of the Republic of Ireland, practice cancelling a placement, finding a practice that would provide opportunities to develop clinical practical skills, requirements for small animal internships post-graduation.

Financing CEMS placements

Participants were asked to approximate how many placements of their CEMS were financed according to a list of categories. The mean number of placements respondents undertook in locations that were easily accessible and did not involve significant additional costs to attend, for example staying with family or friends, was 6.6 (range 0-12, *n*=72). The mean number of placements that were at a distance where respondents had to find and pay for accommodation was 2.5 (range 0-12, *n*=61). While the mean number of placements that were at a distance and required a loan or money to be borrowed from family or friends to cover costs was 1.5 (range 0-7, *n*=64). Placements that were at a distance and had accommodation costs covered ranged between 0–7, mean was 0.9, *n*=57.

Learning activities on CEMS

This section of the questionnaire aimed to explore what learning activities students engaged in while on CEMS, results are provided in Table 3. In response to passive learning activities that were primarily associated with observation, for example observing a veterinary practitioner to complete a clinical task, 91% indicated they *almost always* engaged in this type of activity; while 80% indicated they *almost always* observed a team managing a case. The modal response to learning activities associated with assisting practitioners / team to complete a clinical task or manage a clinical case was *sometimes,* however 44% indicated they *almost always* assisted a veterinary practitioner to complete a clinical task, while 41% indicated they *almost always* assisted managed a

Table 2 Obstacles to securing CEMS placements ordered by frequency of selection

Obstacles to CEMS planning	n	% selected
Placements I wanted were already booked out	32	44%
I could not finance certain placements I wanted	29	40%
Not applicable, I got all the placements I wanted	24	33%
I could not find placements in the geographical area I wanted	14	19%
I took placements that I could secure	12	17%
I did not have enough time to do all the types of placements I wanted	10	14%
I did not get enough placements in specialist/referral practices	9	13%
I was not aware that the timing of placements (i.e. seasonal) would affect my learning experiences	8	11%
I did not know where to find appropriate placements	6	8%
I was not confident enough to contact a veterinary practice	6	8%
I did not get the mix of species I was looking for	4	6%
I did not get enough first opinion only placements	3	4%
I could not find placements on a research project I wanted	3	4%
I did not get enough public health placements	2	3%
I could not find placements in a laboratory I wanted	0	0%

Table 3 Frequency of learning activities on placements overall. Ranked by weighted mean

Learning Activity	Never (1)	Rarely (2)	Every once in a while (3)	Sometimes (4)	Almost always (5)	Total Responses (n)	Mode	Weighted Mean
Observing a veterinary practitioner completing a clinical task	0%	0%	2%	8%	***91%***	66	5	4.89
Observing a veterinary practitioner / team managing a clinical case	0%	0%	3%	17%	***80%***	66	5	4.77
Assisting a veterinary practitioner to complete a clinical task	0%	0%	8%	***49%***	44%	66	4	4.36
Assisting a veterinary practitioner / team to manage a clinical case	0%	0%	12%	***47%***	41%	66	4	4.29
Asking a member of staff in the veterinary practice for advice	0%	5%	5%	***48%***	43%	65	4	4.29
Discussing a clinical case with the veterinary team	0%	2%	14%	***42%***	***42%***	66	4[a]	4.26
Performing clinical skills under direct supervision	0%	2%	11%	***62%***	26%	66	4	4.12
Receiving feedback on my clinical tasks from a member of staff in the veterinary practice	5%	8%	32%	***38%***	18%	66	4	3.58
Reflecting on my previous tasks	0%	15%	28%	***40%***	17%	65	4	3.58
Performing clinical skills with supervision at a distance	0%	20%	20%	***55%***	6%	66	4	3.47
Acquiring new information from the practice learning resources (e.g. literature, books etc.)	5%	11%	30%	***44%***	11%	66	3	3.45
Using the practice's training materials or any documentation relating to protocols or standard operating procedures	14%	11%	26%	***36%***	14%	66	3	3.26
Discussing my learning goals with my supervisor	11%	32%	24%	***27%***	6%	66	2	2.86

Mode highlighted in bold and italics. [a]indicates there was more than one mode

clinical case. 88% noted they performed clinical skills under direct supervision *sometimes* or *almost always*. The reported frequency of performing clinical skills with supervision at a distance was varied, 40% reported they *rarely* or *every once in a while* engaged in this activity, compared to *61%* who indicated they *sometimes or almost always*. Learning activities that are more strongly related to SRL processes varied in frequency of occurrence. As seen in Table 3, when all statements were ranked by weighted mean, respondents' experiences of discussing learning goals with a placement host was the lowest ranked learning activity statement. There was varying frequency of reported engagement with this task, 51% indicated *sometimes* or *every once in a while* and 43% indicated *never* or *rarely*. 43% indicated they *rarely* or *every once in a while* reflected on their previous tasks, while 57% *sometimes* or *almost always* did. There were varying experiences of receiving external feedback from staff members in the clinic and utilising the practices in-house learning resources. 91% of respondents indicated that they *sometimes* or *almost always* asked a member of staff in the veterinary for advice.

Assessment of learning experiences on CEMS

Participants were asked to self-assess their learning experiences on CEMS and to indicate how it supported the development of their professional attributes, clinical skills and understanding of veterinary professional working life, results are shown in Table 4, which are ranked by weighted mean. The majority of respondents *agreed* or *strongly agreed* that CEMS supported the development of all competencies except for the preparation of accurate medicals where the modal response was *strongly disagree*. Both statements in the questionnaire that related to CEMS supporting an appreciation of veterinary professional daily life and experience of general practice / primary care settings were rated very highly, the majority of respondents either *agreed* or *strongly agreed* with these statements. 65% of respondents *agreed* that CEMS helped them to recognise their limitations and to identify where to seek support. 73% *agreed* that CEMS supported them to understand situations that required referral. There was variability between specific learning experiences in terms of learning how veterinary practices are run as a business and history taking skills.

Part two of this paper will appear in next month's *Veterinary Ireland Journal*.