

Student Perceptions and Usage of Virtual Reading Rooms for Learning and Research at the General Sir John Kotelawala Defence University, Sri Lanka

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Abstract

Advancements in technology have led to a rapid expansion of digital resources in higher education, transforming the role of academic libraries beyond traditional print-based services. Academic libraries have increasingly adopted digital strategies to ensure effective access to both print and electronic resources. Within this context, Virtual Reading Rooms (VRRs) have emerged as structured digital platforms that provide organized access to curated scholarly materials (Emory University Libraries, n.d.). In response, the library at General Sir John Kotelawala Defence University (KDU), in collaboration with academic staff, developed faculty-based VRRs using open-access resources to support teaching, learning, and research. This study investigates students' perceptions and usage of VRRs at KDU, focusing on accessibility, resource utilization, and the influence of faculty-level promotion on student engagement. A mixed-methods approach was adopted, combining a structured online questionnaire administered to students across all faculties with semi-structured interviews conducted with library professionals to complement and validate the quantitative findings. Using the Krejcie and Morgan Table, a stratified sample of 515 students was selected from a population of 6,304 across all faculties. Students generally perceived faculty-based VRRs as valuable resources that support learning and research through access to digital academic materials. However, a gap persisted between awareness and actual usage, with institutional promotion and curriculum integration influencing student engagement. E-books and course-related materials were the most frequently accessed resources, while technical challenges, limited familiarity, and a preference for printed materials constrained usage. The findings underscore the need for increased awareness, enhanced user support, and greater academic integration to improve VRR utilization.

Keywords: Academic Libraries, Digital Libraries, Kotelawala Defence University, Open Access Resources, Teaching and Learning Support, Virtual Reading Rooms.

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Introduction

Technological advancements have brought significant changes to higher education, particularly in resource management and student engagement in academic activities. The widespread adoption of digital platforms reflects the evolving expectations of Generation Z students, who are highly proficient with digital technologies and increasingly favor technology-mediated learning environments. Mashroofa (2012) found that Sri Lankan undergraduate students in the Net Generation preferred digital and web-based resources over traditional print materials. This finding underscores the importance of developing technology-enhanced learning environments that address the changing needs of contemporary learners. Despite the financial and operational challenges of implementing and maintaining digital systems, these platforms have become essential for promoting academic engagement and ensuring equitable access to scholarly information.

Opportunities to improve access to scholarly knowledge have been further expanded with the global movement for Open Science within this changing digital landscape. According to the UNESCO Recommendation on Open Science (2021), Open Science aims to make scientific knowledge openly available, accessible, and reusable for the benefit of both the scientific community and society. Therefore, Open Science promotes transparency, collaboration, and the unrestricted sharing of research outputs, including open-access publications, research data, and educational resources, which have influenced scholarly communication systems and digital knowledge infrastructures worldwide, significantly increasing the adoption of open science practices. Accordingly, university libraries facilitate access to open-access resources, research data management, and open educational resources. By integrating archived, open-access materials and reliable web-based academic resources, digital platforms such as VRRs support the broader goals of open science, which provides students and researchers with reliable, freely accessible academic content and inclusive, equitable access to information (Liu & Liu, 2023).

To enhance access to academic electronic resources for undergraduate and postgraduate students, General Sir John Kotelawala Defence University (KDU), a leading defense-focused higher education institution in Sri Lanka, has established faculty-based Virtual Resource Rooms (VRRs) tailored to each faculty's disciplinary needs. Library staff collaborated with academic faculty to design these virtual platforms, supporting structured learning, promoting research engagement, and providing organized access to selected open-access academic

materials. To inform further development, it is necessary to analyze students' perceptions and usage of VRRs in relation to academic engagement.

Objectives of the Study

The general objective is to examine student perceptions and usage of Virtual Reading Rooms for learning and research at General Sir John Kotelawala Defence University, Sri Lanka.

Specific Objectives:

1. To assess students' awareness and usage of VRRs.
2. To identify the types of VRR resources used.
3. To examine students' perceptions of VRRs.
4. To identify challenges in using VRRs.

Conceptual Framework

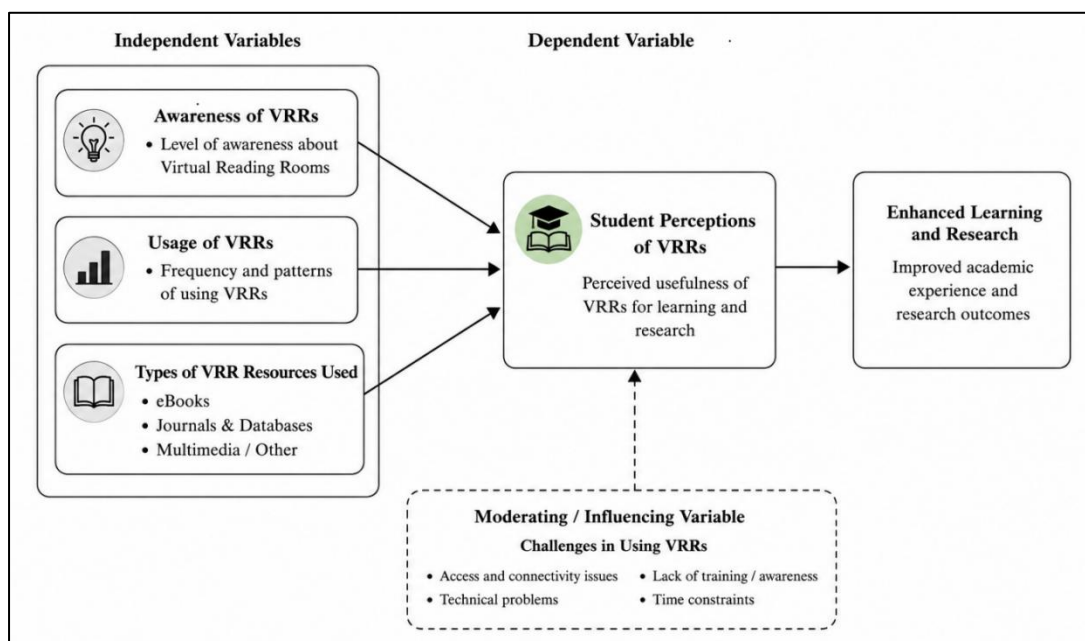


Figure 01: Conceptual Framework for the study

The above conceptual framework was developed based on findings from the literature on Virtual Reading Rooms (VRRs) in academic libraries. It explains how different factors related to VRRs influence students' learning and research experiences. The framework identifies three independent variables: Awareness of VRRs, Usage of VRRs, and Types of VRR Resources Used. These factors influence the dependent variable, Student Perceptions of VRRs, which

refers to students' views on the usefulness of VRRs for academic activities. Positive perceptions of VRRs are expected to lead to enhanced learning and research outcomes, including improved access to information, deeper understanding of coursework, better learning experiences, and stronger research support. The framework also includes challenges in using VRRs as a moderating variable. Factors such as connectivity issues, technical problems, lack of training, preference for printed materials, unawareness of the benefits, and time constraints may affect students' effective use of VRRs and influence their perceptions.

Literature Review

This literature review examines Virtual Reading Rooms (VRRs), focusing on their development, applications in academic libraries, implementation challenges, and relevance in defence university contexts. However, existing studies are largely grounded in conventional higher education settings, offering limited insight into VRR practices within military or defence-affiliated institutions. Consequently, there remains insufficient empirical evidence on how institutional structures and operational constraints influence VRR usage in such environments. In addition, prior research has tended to emphasize technological infrastructure and resource availability, while paying comparatively less attention to user-centred dimensions such as access experiences, engagement patterns, and usage challenges, as well as strategies for promoting faculty-based VRRs.

The concept of digital and virtual reading environments originated as a means of expanding access to restricted academic collections beyond physical library spaces. Avdeeva (2010), for instance, conceptualized VRRs as secure digital dissertation libraries that preserve copyright and intellectual property rights, functioning as controlled extensions of traditional reading rooms rather than open-access repositories. With technological advancements, the role of VRRs has expanded to include current awareness services and targeted dissemination of scholarly information (Badman & Hartman, 2008), reflecting the evolution of academic libraries into hybrid spaces integrating physical and virtual services (Shoham & Klain-Gabbay, 2019). Jacob and Deligiannidis (2005) further describe VRRs as structured digital environments that provide remote access to curated scholarly resources while maintaining security and academic integrity, a view supported by Ajibade and Mutula (2021), who highlight their value in specialized and restricted academic contexts.

The rapid transition to online learning during the COVID-19 pandemic further accelerated the adoption of VRRs, positioning them as essential components of academic continuity rather than optional services. Studies such as those by Ajibade and Mutula (2021) and Sun (2023) emphasize that VRRs now play a critical role in sustaining teaching and research activities through virtual platforms. International case studies also demonstrate their adaptability across diverse academic contexts, with Kamposiori (2023) recognizing their role in integrating institutional workflows with postgraduate research and interdisciplinary collaboration. Similarly, empirical evidence from university settings indicates positive student perceptions of virtual academic spaces, including improved accessibility, motivation, and academic engagement (Tapping, 2021), while effective implementation depends on usability, integration with pedagogy, and institutional support (Teacher Professional Development, 2025).

Despite these benefits, several challenges affect VRR adoption and effectiveness. Technical barriers such as limited connectivity, system reliability issues, and low digital literacy remain significant constraints, particularly in developing contexts (Perera & Suraweera, 2023). Usability factors, including interface design and navigation, further influence user experience (Ajibade & Mutula, 2021). Additionally, financial constraints and sustainability concerns continue to affect the development of VRR platforms, especially in resource-constrained universities and defence institutions (Seneviratne et al., 2023). Institutional and pedagogical factors—such as policy support, staff training, and integration into teaching practices—also play a critical role in determining VRR effectiveness (Marikar & Jayarathne, 2016; Vargas-Murillo & de la Asuncion Pari-Bedoya, 2023).

Within this context, KDU has developed faculty-based VRRs to support teaching, learning, and research through curated open-access resources aligned with academic programmes. This initiative reflects both resource constraints and the need for flexible digital access within a structured defence university environment. However, despite their implementation, there is limited empirical evidence on how students perceive and use these VRRs in practice. Prior studies suggest that gaps may exist between availability, awareness, and actual usage of digital library services (Mangrum & Foster, 2020), while perceptions of virtual academic services are shaped by familiarity, engagement, and service quality (Bennett, 2021). These insights emphasize the need to examine students' awareness of VRRs, their usage patterns, and the types of resources accessed, particularly within a defence-oriented higher education context.

Accordingly, this study addresses these gaps by examining student perceptions and usage of VRRs for learning and research at KDU, Sri Lanka. It specifically focuses on assessing students' awareness and usage of VRRs and identifying the types of VRR resources used, to generate evidence-based insights to enhance access, engagement, and the overall effectiveness of virtual academic support services in a defence university setting.

Methodology

A mixed-methods approach was used in this study to investigate student's perceptions and use of Virtual Reading Rooms for learning and research at the General Sir John Kotelawala Defence University. That is, qualitative and quantitative methods were combined to conduct a comprehensive evaluation of VRRs' use, perceived benefits, and implementation challenges. From November 2025 to January 2026, quantitative data were collected by distributing a structured online questionnaire to students across all KDU faculties. All participants were given access to the Virtual Reading Rooms (VRRs) via a link in the questionnaire prior to data collection, to provide their perceptions of learning impact, resource access, and suggestions. Multiple-choice questions in the questionnaire captured respondents' sources of awareness, the types of resources they accessed, and the reasons they did not access the resources. Closed-ended and Likert-scale questions were used in the questionnaire to assess awareness of VRRs, frequency of use, academic applications, perceived usage in learning and research, and potential barriers. Subject experts in the library profession reviewed the questionnaire to ensure its content validity and alignment with the study's objectives. A pilot test was conducted with 34 students (10% of the sample size) to evaluate the clarity, relevance, and reliability of the questionnaire. Based on the feedback received, minor revisions were made to improve the instrument before the main data collection.

The total student population of KDU was 6,304. According to the Krejcie and Morgan sample size determination table cited by Uma Sekaran and Roger Bougie (2014), a minimum sample of 342 respondents was required at a 95% confidence level and a 5% margin of error. To ensure adequate representation from all faculties, the student population was stratified by faculty. Proportionate stratified random sampling was then employed, with the sample size for each faculty calculated proportionally using the formula.

$$n_h = \frac{N_h}{N_{total}} \times n$$

(n_h - the sample size for each faculty; N_h - the population of the respective faculty; N_{total} - the total student population, and n - the total sample size) (Sekaran, U., & Bougie, R., 2010).

To account for potential non-responses and incomplete questionnaires, the survey was distributed to several students, with a slightly larger number of students than 515. However, all selected participants responded, resulting in a final response rate of 100%.

Table 01: Sample Size Determination (From Krejcie & Morgan Table)

Faculty	Population	Sample Size	Actual Sample
FAHS	979	53	80
FBESS	256	14	21
FDSS	202	11	17
FMSH	1,148	62	93
FOC	622	34	51
FOCJ	179	10	15
FOE	930	50	75
FOL	549	30	45
FOM	829	45	68
FOT	610	33	50
Total	6,304	342	515

Semi-structured interviews were conducted with library professionals to complement the survey findings. These discussions discovered the resource management, collaboration with academic staff, and service sustainability required for VRR development. Quantitative data were presented in Microsoft Excel, and descriptive statistics were used to analyze. Qualitative data were analyzed to identify recurring patterns and related insights. To address the ethical aspects of the study, the survey ensured voluntary participation, maintained the respondent's confidentiality, and used the collected data only for academic and research purposes. Also, no personally identifiable data was gathered from this survey. To assess students' perceptions and usage of VRRs on learning and research, respondents were allowed to access them before completing the questionnaire. Consequently, the findings reflect user experiences and

perceptions from this period and may not include later updates or improvements to the VRR platforms.

This study mainly focuses on KDU. Therefore, the study's findings may be limited to this study and cannot be generalized to other higher education institutions. Other limitations include the study's reliance on self-reported survey data, which may be subject to respondent bias or personal interpretation, potentially influencing the results. The study also considers only open-source resources accessible through VRR and excludes subscription-based or commercial databases, thereby limiting the scope of the resource evaluation.

Results and Discussion

This study examined awareness, access, and use to assess the impact of faculty-based VRRs on KDU students' learning and research.

Table 02: Faculty-wise Awareness of VRRs

Faculty	Sample	Awareness	
		Yes	No
Allied Health Science (FAHS)	80	35(48%)	45(52%)
Built Environment & Spatial Sciences (FBESS)	21	16(76%)	5(24%)
Defence & Strategic Studies (FDSS)	17	12(71%)	5(29%)
Management, Social Sc, & Humanities (FMSH)	93	58(62%)	35(38%)
Computing (FOC)	51	25(50%)	26(50%)
Criminal Justice (FOCJ)	15	5(33%)	10(67%)
Engineering (FOE)	75	45(60%)	30(40%)
Law (FOL)	45	30(67%)	15(33%)
Medicine (FOM)	68	25(37%)	43(63%)
Technology (FOT)	50	9(18%)	41(82%)
TOTAL	515	260(50%)	255(50%)

Faculty-wise awareness of VRRs was tabulated in Table 02 above. It clearly shows significant variation in students' awareness of VRR across faculties. Overall, 260 (50%) of 515 respondents reported being aware of this service, but 255 (50%) reported being unaware of it before this survey. When considered separately, FBESS (76%) and FDSS (71%) reported the highest awareness, whereas FOT (18%) and FOCJ (33%) reported the lowest. Moreover,

FMSH (62%), FOE (60%), and FOL (67%) were also identified as having moderate awareness. These differences may be attributed to variations in faculty-level promotional strategies and the extent to which digital resources are integrated into academic activities. According to the library professionals interviewed, faculties that actively promote VRRs and incorporate digital resources into teaching and learning activities tend to demonstrate higher levels of student awareness and usage. Therefore, well-developed motivational and awareness programmes are needed to ensure that students in all faculties are equally informed about available digital learning resources.

Table 03: Faculty-wise Access to VRRs

Faculty	Sample	Access to VRR	
		Yes	No
FAHS	35	12(34%)	23(66%)
FBESS	16	5(31%)	11(69%)
FDSS	12	12(100%)	0(0%)
FMSH	58	46(79%)	12(21%)
FOC	25	7(28%)	18(72%)
FOCJ	5	0(0%)	5(100%)
FOE	45	0(0%)	45(100%)
FOL	30	4(13%)	26(87%)
FOM	25	0(0%)	25(100%)
FOT	9	1(11%)	8(89%)
TOTAL	260	87(33%)	173(67%)

Table 03 above presents data on students who used the platform, among the 260 students who were aware of VRRs at the time of the survey. At the beginning of the survey, only 87 (33%) of the 260 students who were aware of the VRRs platform had accessed it. The remaining 173 students (67%) were aware of its existence but had not used it. Therefore, these results indicate a significant gap between awareness and actual usage. The faculty's analysis also reveals significant disparities in access. For example, FDSS reported complete usage among the aware respondents (100%), while relatively high access levels were observed in FMSH; 79% of respondents were aware of it. In contrast, FOCJ, FOE, and FOM did not report any prior access to VRR among respondents who were aware of it. Thus, it is confirmed that awareness alone does not lead to usage. Overall, these findings suggest that knowledge of system usage,

usefulness, and availability of relevant resources may be additional factors influencing users' decisions to increase VRR use.

Table 04: Distribution of Sources of Awareness Across Faculties

Faculty	Aware of VRRs	Library Web	Library Orientation	From a Friend	Awareness Session	Library Staff
FAHS	35	6(17%)	14(40%)	6(17%)	3(9%)	11(31%)
FBESS	16	6(38%)	2(13%)	3(19%)	2(13%)	14(18%)
FDSS	12	4(33%)	0(0%)	6(50%)	1(8%)	2(17%)
FMSH	58	6(10%)	6(10%)	28(48%)	19(33%)	7(12%)
FOC	25	9(36%)	2(8%)	8(32%)	5(20%)	2(8%)
FOCJ	5	3(60%)	1(20%)	1(20%)	0(0%)	2(40%)
FOE	45	27(60%)	4(9%)	12(27%)	1(2%)	7(16%)
FOL	30	3(10%)	10(33%)	12(40%)	3(10%)	6(20%)
FOM	25	15(60%)	1(4%)	1(4%)	2(8%)	9(36%)
FOT	9	3(33%)	2(22%)	1(11%)	1(11%)	2(22%)
TOTAL	260	82(32%)	42(16%)	78(30%)	37(14%)	67(26%)

Table 04 above shows how respondents learned about VRRs and highlights the significance of various communication channels. Identified the library web (32%) as the most common source, followed by friends or peers (30%). Orientation programmes (16%) and formal awareness sessions (14%) were mentioned less frequently. Meanwhile, the comparatively lower impact of formal awareness sessions suggests an opportunity for the library and faculty to enhance structured promotional efforts.

The frequency of usage was tabulated in Table 05 below. Among the 87 respondents who had accessed VRRs at the beginning of the survey, the majority reported weekly use (52%), followed by monthly use (25%) and rare use (17%). Only 6% of respondents indicated daily use of VRRs. These findings indicate that although VRRs are used by some students, they have not yet become a standard part of students' regular academic routines. The prevalence of weekly use suggests that students' preliminary access to VRRs is for specific academic needs,

such as completing assignments or preparing for exams, rather than as a continuous learning resource.

Table 05: Distribution to VRRs Access Frequency

Faculty	Access of VRRs	Usage Frequency			
		Daily	Weekly	Monthly	Rarely
FAHS	12	0(0%)	8(67%)	3(25%)	1(8%)
FBESS	5	0(0%)	3(60%)	0(0%)	2(40%)
FDSS	12	0(0%)	7(58%)	4(33%)	1(8%)
FMSH	46	4(9%)	20(43%)	13(28%)	9(20%)
FOC	7	1(14%)	2(29%)	2(29)	2(29%)
FOCJ	0	0(0%)	0(0%)	0(0%)	0(0%)
FOE	0	0(0%)	0(0%)	0(0%)	0(0%)
FOL	4	0(0%)	4(100%)	0(0%)	0(0%)
FOM	0	0(0%)	0(0%)	0(0%)	0(0%)
FOT	1	0(0%)	1(100%)	0(0%)	0(0%)
TOTAL	87	5(6%)	45(52%)	22(25%)	15(17%)

Table 06: Resources Accessed by Students with VRRS Awareness and Usage

Faculty	Access to VRRs	Resources Accessed				
		E-Books	E-Journals	Databases	Course Materials	Multimedia
FAHS	12	8(67%)	0(0%)	1(8%)	4(33%)	1(8%)
FBESS	5	3(60%)	0(0%)	1(20%)	2(40%)	1(20%)
FDSS	12	6(50%)	1(8%)	1(8%)	7(58%)	5(42%)
FMSH	46	24(52%)	7(15%)	12(26%)	20(43%)	9(20%)
FOC	7	5(71%)	1(14%)	2(29)	3(43%)	2(29%)
FOCJ	0	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
FOE	0	0(0%)0	0(0%)	0(0%)	0(0%)	0(0%)
FOL	4	2(50%)	0(0%)	0(0%)	2(50%)	0(0%)
FOM	0	0(0%)0	0(0%)	0(0%)	0(0%)0	0(0%)
FOT	1	1(100%)	0(0%)	0(0%)	1(100)	0(0%)
TOTAL	87	49(56%)	9(10%)	17(20%)	39(45%)	18(21%)

As shown in Table 06 above, the VRRs are most frequently used to access e-books (56%), followed by course materials (45%). Other resources, such as multimedia materials (21%), databases (20%), and e-journals (10%), were accessed less often. The relatively high use of e-books and course materials indicates that students depend on VRRs for direct academic support with coursework. Conversely, the lower usage of databases and e-journals may suggest limited awareness of advanced research resources or a preference for easily accessible learning materials.

Table 07: Reasons for Not Accessing VRRs Despite Awareness

Faculty	Aware but not accessed	Barriers to Access VRRs				
		No Time	Preferred	Technical	Not aware	Forgotten
			Printed Books	Difficulties	the benefits	
FAHS	23	4(17%)	5(22%)	21(91%)	0(0%)	2(9%)
FBESS	11	3(27%)	3(27%)	2(18%)	0(0%)	4(36%)
FDSS	0	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
FMSH	12	4(33%)	6(50%)	4(33%)	2(17%)	0(0%)
FOC	18	6(33%)	3(17%)	3(17%)	9(50%)	1(5%)
FOCJ	5	1(20%)	0(0%)	2(40%)	1(20%)	1(20%)
FOE	45	14(31%)	9(20%)	42(93%)	15(33%)	0(0%)
FOL	26	5(19%)	15(58%)	8(31%)	6(23%)	3(12%)
FOM	25	5(20%)	11(44%)	21(84%)	0(0%)	7(28%)
FOT	8	1(12.5%)	0(0%)	2(25%)	3(37.5%)	0(0%)
TOTAL	173	43(25%)	52(30%)	110(64%)	36(21%)	18(11%)

Among respondents who were aware of VRRs but had not accessed them, several barriers were identified. Table 07 above shows that the most reported challenge was technical difficulties (64%), followed by a preference for printed books (30%) and lack of time (25%). Additionally, 21% of respondents indicated they were not fully aware of the benefits of VRRs, while 11% reported having forgotten about the service. As highlighted in the findings, technological accessibility and system usability are essential factors influencing the effective use of digital resources. Furthermore, technological barriers may discourage students from using this platform. In addition, the preference for printed materials suggests that some users still rely on traditional learning resources.

The data obtained after accessing the platform were tabulated in Tables 08–11 and analyzed.

Note for Table 08 to 11: SA- Strongly Agreed, A-Agreed, N-Neutral, DA-Disagreed, SDA-Strongly Disagreed

Table 08: Impact of VRRs on Coursework Understanding

Faculty	Sample	Better Understanding of Course Work				
		SA	A	N	DA	SDA
FAHS	80	14(18%)	51(64%)	14(18%)	1(1%)	0(0%)
FBESS	21	5(24%)	13(62%)	3(14%)	0(0%)	0(0%)
FDSS	17	1(6%)	12(71%)	3(18%)	1(6%)	0(0%)
FMSH	93	16(17%)	45(48%)	32(34%)	0(0%)	0(0%)
FOC	51	4(8%)	29(57%)	18(35%)	0(0%)	0(0%)
FOCJ	15	1(7%)	7(47%)	6(40%)	1(7%)	0(0%)
FOE	75	7(9%)	42(56%)	23(31%)	2(3%)	1(1%)
FOL	45	1(2%)	29(64%)	14(31%)	1(2%)	0(0%)
FOM	68	3(4%)	27(40%)	37(54%)	0(0%)	1(1%)
FOT	50	5(10%)	28(56%)	16(32%)	1(2%)	0(0%)
TOTAL	515	57(11%)	283(55%)	166(32%)	7(1%)	2(0%)

The data in Table 08 above indicate that VRRs positively contributed to students' understanding of the coursework. Overall, 66% of respondents reported that VRRs helped them better understand their coursework, while 32% were neutral. Only a small proportion of respondents (approximately 1%) indicated that VRRs did not support their understanding of their coursework. The results suggest that VRRs serve as a supportive learning space where students can access additional materials to reinforce classroom learning.

Table 09 below presents responses to the VRRs' contribution to research and learning. According to these data, almost half of the respondents (47%) reported that VRRs positively supported their learning and research activities, while 45% reported it was neutral. However, a minority of respondents (8%) reported that VRRs did not support their research and learning. The relatively high neutral response rate may suggest that some students have limited experience with the platform or have not yet fully explored its resources.

Table 09: Impact of the VRRs on Learning and Research

Faculty	Sample	Positive Contribution to Research & Learning				
		SA	A	N	DA	SDA
FAHS	80	6(8%)	43(54%)	25(31%)	2(3%)	4(5%)
FBESS	21	2(10%)	11(52%)	8(38%)	0(0%)	0(0%)
FDSS	17	2(12%)	8(47%)	7(41%)	0(0%)	0(0%)
FMSH	93	2(2%)	39(42%)	42(45%)	4(4%)	7(8%)
FOC	51	2(4%)	23(45%)	24(47%)	1(2%)	0(0%)
FOCJ	15	0(0%)	6(40%)	7(47%)	2(13%)	0(0%)
FOE	75	2(3%)	32(43%)	34(45%)	4(5%)	3(4%)
FOL	45	1(2%)	18(40%)	22(49%)	1(2%)	3(7%)
FOM	68	2(3%)	13(19%)	46(68%)	5(7%)	2(3%)
FOT	50	2(4%)	30(60%)	16(32%)	0(0%)	2(4%)
TOTAL	515	21(4%)	223 (43%)	231(45%)	19(4%)	21(4%)

Table 10: Impact of the VRRs on Independent Learning

Faculty	Sample	Encouraged Independent Learning				
		SA	A	N	DA	SDA
FAHS	80	15(19%)	53(66%)	11(14%)	1(1%)	0(0%)
FBESS	21	3(14%)	11(52%)	7(33%)	0(0%)	0(0%)
FDSS	17	2(12%)	9(53%)	6(35%)	0(0%)	0(0%)
FMSH	93	13(14%)	41(44%)	36(39%)	2(2%)	1(1%)
FOC	51	4(8%)	29(57%)	17(33%)	1(2%)	0(0%)
FOCJ	15	1(7%)	8(53%)	5(33%)	1(7%)	0(0%)
FOE	75	3(4%)	42(56%)	26(35%)	1(1%)	3(4%)
FOL	45	3(7%)	25(56%)	16(36%)	1(2%)	0(0%)
FOM	68	7(10%)	29(43%)	31(46%)	0(0%)	1(1%)
FOT	50	6(12%)	34(68%)	10(20%)	0(0%)	0(0%)
TOTAL	515	57 (11%)	281(55%)	165 (32%)	7 (1%)	5(1%)

The data in Table 10 above indicate that VRRs support independent learning practices: 66% of respondents agreed or strongly agreed that VRRs foster independent learning, while 32% expressed neutral opinions. The findings indicate that access to curated digital resources enables students to engage in self-directed exploration of academic materials, an essential component of higher education learning environments.

Data on the accessibility of VRRs were tabulated in Table 11 below, demonstrating that 42% of respondents agreed that it is easy to access academic resources through the VRRs, whilst 51% remained neutral. A small proportion (7%) of respondents reported difficulty accessing resources. The high neutral responses could be due to students' digital literacy or differences in familiarity with the VRR interface. The findings also emphasize the importance of improving system usability and offer guidance on using the platform efficiently.

Table 11: User Perceptions of VRRs for Access to Academic Resources

Faculty	Sample	Easy to access academic resources				
		SA	A	N	DA	SDA
FAHS	80	7(8%)	35(44%)	32(40%)	4(5%)	2(3%)
FBESS	21	0(0%)	12(57%)	8 (38%)	1(5%)	0(0%)
FDSS	17	0(0%)	9(52%)	5(29%)	3(18%)	0(0%)
FMSH	93	1(1%)	38(41%)	47(51%)	3(3%)	4(4%)
FOC	51	1(2%)	21(41%)	25(49%)	4(8%)	0(0%)
FOCJ	15	0(0%)	4(27%)	11(73%)	0(0%)	0(0%)
FOE	75	1(1%)	26(35%)	44(59%)	3(4%)	1(1%)
FOL	45	0(0%)	12(27%)	32(71%)	0(0%)	1(2%)
FOM	68	1(1%)	18(26%)	42(62%)	6(9%)	1(1%)
FOT	50	2(4%)	26(52%)	19(38%)	1(2%)	2(4%)
TOTAL	515	13(3%)	201(39%)	265(51%)	25(5%)	11(2%)

The semi-structured interviews with library professionals provided complementary insights to the survey results. The findings indicated that effective resource management is essential for the development and sustainability of Virtual Reading Rooms (VRRs), particularly in ensuring the continuous updating and relevance of digital content. Participants also highlighted the importance of collaboration between library staff and academic faculty in identifying, selecting, and integrating appropriate learning resources aligned with curriculum requirements.

In addition, service sustainability was identified as a critical concern, with emphasis placed on institutional support, technological infrastructure, and ongoing evaluation to maintain VRR effectiveness. Overall, these qualitative findings reinforce the survey results and highlight that the successful implementation of VRRs depends on coordinated resource management, academic collaboration, and sustained institutional commitment.

Conclusion

The findings of this study indicate that students perceive faculty-based Virtual Reading Rooms (VRRs) at General Sir John Kotelawala Defence University as valuable resources that support their learning and research activities by providing convenient access to curated digital academic materials. However, a clear gap persists between students' awareness of VRRs and their actual usage, suggesting that awareness alone does not necessarily translate into effective engagement. The level of institutional promotion and the integration of VRRs into academic programmes were found to shape students' perceptions significantly and influence their likelihood of use. The results further reveal that students are more likely to access e-books and course-related materials through VRRs, indicating their relevance in supporting academic work and independent learning. Nevertheless, usage remains constrained by several factors, including technical difficulties, limited familiarity with the platform, and a continued preference for printed resources. Despite these challenges, students generally perceive VRRs as useful tools for accessing learning materials and supporting their studies. Overall, the study highlights the importance of strengthening awareness initiatives, improving user support, and enhancing the integration of VRRs within academic activities to promote more effective use. These measures are essential for maximizing the VRRs' role in supporting student learning and research within a structured defence university environment.

Recommendations

Improving the effectiveness of VRR could be achieved through a combination of user awareness, teaching practices, and institutional support. The university should integrate VRRs into academic policies and course structures, making them a regular part of teaching and learning. Lecturers have an important role to play in this, as they can collaborate with library professionals to develop VRR by selecting relevant open-source materials for lectures, recommended readings, and assignments, and by motivating students to use those materials through VRR. At the same time, the study recommended conducting regular awareness

programs and training sessions to help users understand how to access VRRs effectively. Outdated materials may reduce user interest. So, regular monitoring is important to keep content up to date, which can be done by uploading the latest and most relevant resources. It is also recommended to have a user-friendly platform and provide easy remote access, which will improve accessibility and could further encourage usage. In addition, regular monitoring of VRR usage across faculties helps identify areas for improvement. Overall, a collaborative effort between the institution, faculty, and library can support the meaningful and sustained use of VRRs in the academic environment.

Future Research

Future research could be valuable if the influence of VRR is explored across different higher education institutions, including military and defence-oriented colleges, whose learning environments differ from those of other institutions, thereby helping to fill the current gap in the literature on defence-related research. It is necessary to conduct research to identify effective strategies to increase VRR use among university students and academic staff. Furthermore, future research should focus on identifying strategies to incorporate VRR into teaching and learning practices.

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