

# **SCHOOL TEACHER PREPARATION AND PROFESSIONAL DEVELOPMENT FOR VIRTUAL SCHOOLING IN THE USA AND NEW ZEALAND**

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## **ABSTRACT**

School students in New Zealand and the USA commonly learn from a teacher who is not in their school using a variety of technologies including video conference and web-based learning management systems. Rapid expansion in this area is expected. It is therefore essential that teacher preparation programmes include this mode of schooling. This paper describes curriculum resources together with an instrument that has successfully evaluated VS competence as a VS site facilitator.

## **THE GROWTH OF VIRTUAL SCHOOLING**

Virtual Schooling (VS) is a system through which primary and secondary students learn via one or more communication technologies from a teacher who is at a distance (Davis & Ferdig, 2009) and a 'virtual school' is an educational organization that offers K-12 courses through Internet or Web-based methods" (Clark, 2001, p.1). It has a long history in many

more industrialized nations where access to teachers is challenged by geography including Australia (Davis & Niederhauser, 2005; Searle & Mandile 2003) and New Zealand (Browning, 2005; Dewstow & Wright, 2005; Stevens & Moffatt, 2003). In addition to expanding course offerings and scheduling flexibility, the New Zealand Correspondence School has recently begun to adopt VS approaches to complement its delivery method so that students leaving school can attain some qualifications and are better prepared for tertiary education which is not uncommon for virtual schools (Watson, 2008). Perhaps one of the most influential initiatives was the creation of the first Virtual High School through an innovative project supported by the National Science Foundation (Zucker & Kosma, 2003). The VHS is currently well established with teachers and students in most states in the USA and it has expanded abroad (Pape, 2004). This movement has not been without critique, and justifiably so, with a wide range of approaches, quality of practice, and potential challenges to the preservation of public education (Fulton, 2002). It is interesting to observe that the variation may be linked to the educational ecology within which it arises and that there are few virtual educational organizations that spread beyond nationwide educational systems (educational ecozones) (Davis, 2008).

In the USA VS started in 1996 when the Internet went graphic with browser software (Clark, 2001; Roblyer, 2003; Zucker & Kozma, 2003). Roblyer (2003, p.159) captures this event of the Internet boom and rise of VS very appropriately: “as the popularity of Internet spiraled upward in the 1990s, online course delivery migrated steadily downward from colleges and universities to pre-secondary schools”. Compared to only five states in 1997, 44 states in 2007 had adopted VS (Watson, Gemini & Ryan, 2008). Florida and Utah are the oldest states having VS and their enrolment increased by 50% over the five years from 2006 (Ethan & Tucker, 2006.) In the USA, the National Center for Education Statistics (NCES) reported that during the 2002–2003 school year, about one-third of U.S. public school districts, representing nine percent of public schools, had students enrolled in distance education courses (Setzer, Lewis, & Greene, 2005.) Three years after the NCES report, Tucker (2007) reported that virtual schools served 700,000 students in the 2005–06 school year, mostly at the high school level. Tucker further states this rapid increase in VS will only move in an upward direction in the near future “Although this is only a fraction of the nation's 48 million elementary and secondary students, it is almost double the estimate of students taking online learning courses just three years earlier, and it's a number that is likely to continue to rise rapidly” (Tucker, 2007, para. 2).

In New Zealand the establishment of the Virtual Schooling Network, and over twenty clusters of schools (e-learning clusters) collaborating on the provision of virtual schooling has also grown over this period from around the same time and for the same reasons (Walsh-Pasco, 2004; Lai & Pratt, 2009; Lin & Bolstat, in press). There has also been the evolution of advanced synchronous and asynchronous distance technologies which is linked to the rapid growth in VS. Although the access to distance technology has grown vigorously (Zucker & Kozma, 2003), the role of the teacher still remains at the heart of the VS system (Harms, et al., 2004). Similar to the systemic approach of Distance Education proposed by Moore and Kearsley (1996), VS also operates as a system. In the VS system the heart of the education system continues to be the teacher-student relationship (Harms, Niederhauser, Davis, Roblyer, & Gilbert, 2004). Outlined below are the six key personnel and their roles in a VS system as described by Harms et al (2006).

The VS teacher (T) is responsible for designing the context, initiating activities, establishing and facilitating communication, and assessment. Other roles include instructional designers (D) responsible for creating instructional activities and materials; site facilitators (F) who enable and support students locally— this role is usually taken by a classroom teacher, guidance counsellor (C), or an aide hired specifically for the purpose; the instructional technology (IT) support person role ensures the teacher receives adequate access to technological resources and the network systems function properly; the administrator (A) at the host school supports the teacher in allocating necessary resources, looks after the logistical coordination within and across VS sites, and takes leadership in initiating and maintaining the overall VS system. These roles are complementary and overlapping and are likely to be expressed in different ways in the very different ecologies of schools and virtual organizations (Davis, 2009). In the USA smaller and not well established virtual schools' staff and teachers play multiple roles while, in larger and well established virtual schools, multiple roles evolve in individual positions such as teachers, facilitators, instructional designers, and technology aid (Ferdig, et al., 2009).

### **Need for VS Teachers and complementary VS Roles**

The growth of VS is explosive in the USA. Strong growth is also expected in New Zealand which is evident by the recent funding of at least four super clusters of schools. The Virtual Learning Network that has been established for some time to assist in the uptake and use of broadband technologies around New Zealand is also likely to facilitate growth and make more demands for consistently higher quality teaching and learning through digital

technologies. Government Ministers of Education and Employment are pushing for growth. The Tertiary Education Commission is also promoting the use of e-learning for adults with needs in literacy, language and numeracy (Davis & Fletcher, 2009, in press) and so schools may also have a role in supporting that provision in less accessible locations of New Zealand.

The need for professional development of future teachers as VS instructors and site facilitators is critical. Lin and Bolstad's (2009) research for the New Zealand Ministry of Education indicates that there is high variability in the quality of VS classes. This is indicative of the access to professional development for VS teachers and supporting staff, including site facilitators and e-principals in the participating students' schools. With a growing demand in VS courses, there will be a parallel need for teachers, facilitators, and designers for a successful functioning of VS system (Davis & Roblyer, 2005).

"Virtual Schools and 21<sup>st</sup> Century Skills", found in the North American Council for Online Learning and the Partnership for 21<sup>st</sup> Century Skills (2006) asserted that the 21<sup>st</sup> century needs teacher education programs to prepare teachers for the skills required to teach and facilitate online courses. However, few teacher education programs address VS which means that pre-service teachers are ill equipped to serve as site facilitators or have an awareness of the mode of virtual schooling and related services (Davis, Roblyer, Charania, Ferdig, Harms, Compton & Cho, 2007).

### **Teacher Education goes into Virtual Schooling (TEGIVS)**

As Cavanaugh (2004) states, leadership to promote VS should start at the national level; and in 2004, the United States Department of Education took the leadership and granted funding for a project called 'Teacher Education Goes Into Virtual Schooling' (TEGIVS) under the leadership of Niki Davis. The goal of TEGIVS was to create strategies to prepare pre-service teachers for VS roles, particularly VS site facilitator and VS teacher. This unique and innovative project started in September 2004 and its successful implementation closed in 2008. It was unique, since it was the very first project in the world devoted to preparing pre-service teachers for VS. It was innovative, since it operated within the complex infrastructure of teacher education programs at participating universities; and there was no existing research and literature in the area of VS. Due to the innovative nature of the project, the curricula, evaluation tools, and assessment prepared and administered under the

project were modified every semester, based on usability ratings and other experimental and non-experimental findings from the implementation of the curricula.

### **The Lack of Research in VS Teacher Preparation**

Very little research has been conducted in the area of preparing pre-service teachers for VS. What research has been done was mostly within the context of TEGIVS. Although Compton et al. (2009) address VS preparation in pre-service teacher education, in-service professional development for VS educators has not been studied adequately. Various organizations like the Southern Regional Educational Board (SREB) and the North American Council for Online Learning (NACOL) have published guidelines on competence required to teach and facilitate online courses in K-12. However, these guidelines are not based on research in K-12, and ignore the multiplicity of roles VS teachers may have to play depending on the type of virtual school to which they belong.

It is only recently that the need to formulate research based standards on best practices in teaching and facilitating in VS has been documented. The synthesis Ferdig et al. (2009) has compiled of research in K-12, higher education, and in general teaching and educational technology suggests the range of competencies required of online educators. This synthesis highlights different roles of VS educators and their corresponding tasks as VS teacher, coordinator, instructional designer, site facilitator, etc. This synthesis has set the stage for state and national bodies to lay standards for teaching and facilitating in VS.

Another unexplored area in VS is the development and implementation of tools to evaluate and assess VS staff. These often address technological ability of teachers and few have been tested for reliability and validity (DiPietro et al., 2008). This paper includes a description of a pair of tools used to assess VS competence: a scenario test and a rubric to measure the responses.

### **The Curriculum Resources used to briefly introduce Pre-service Teachers to VS**

The TEGIVS project created and tested a range of curriculum resources for pre-service teacher education programs, including five sets that described different approaches to VS that could be used within a laboratory session with Internet access, or online. These were implemented within the four participating USA universities. These resources are available online for review and use (<http://www.cltt.iastate.edu/~tegivs>). The resources include

examples of scenarios from existing VS courses for K-12 students in the USA. The materials aimed to sensitize pre-service teachers to a range of the many issues that impact the role and responsibilities of a VS facilitator. For example, dealing with plagiarism, internet security, and access to technology and supporting a student who was too ill to attend school. Communicating the role of VS facilitator and its importance were the central focus in these resources. The three aspects highlighted were:

*Technology:*

- The technologies used to support VS that connect K-12 students with teacher(s), students, and/or content beyond their school;
- Support to develop student access to relevant technologies and related skills.

*Mentoring:*

- Counselling and advising the students;
- Establishing and monitoring effective study habits, including health and safety;
- Monitoring assessment, including proctoring tests where relevant.

*Organizational/Collaboration of Educators:*

- Collaborating with the distant teacher, other VS administrators, educators, and organizations to improve student learning in VS.

***Competence Assessment Instrument (CAI)***

Understanding these three aspects of Virtual Schooling from the perspective of VS facilitators is a complex and ill-structured task. First, it is complex and ill-structured because it requires understanding of the three basic aspects (technology, mentoring, and organizational collaboration) as well as the role of facilitator in VS. Second, it requires the learner to interconnect the two concepts (of VS and facilitator). The Competence Assessment Instrument (CAI) was developed to assess pre-service teachers' competence as a VS facilitator.

It had two parts: Part A presented a self rating and a scenario based on VS facilitator competence. Part B was a rubric to assess the open ended responses to the scenario.

*Part A: Scenario based competence:* Scenario was developed by the principal investigator of the project and was presented online using a survey tool called Survey Monkey: (<http://www.surveymonkey.com>).

**Content of the scenario:** The competence based scenario is as follows:

In your first semester as a teacher your mentor tells you that one of your students has been advised to take a course from a Virtual School. She asks you how competent you are to facilitate or coach this student's distance learning.

### **How competent are you?**

Choose from: I don't understand; Not competent; Somewhat competent; or Competent.

If the pre-service teachers indicated "I do not understand" or "Not competent", the survey would take them to the exit window. If the pre-service teachers indicated somewhat competence or competent, they were prompted to provide evidence for their competence:

### **Please give some evidence with a brief description of how you can facilitate the student's virtual schooling course.**

Please frame your description in light of three aspects of Virtual Schooling:

- **Technology:** The technologies used to support VS that connect K-12 students with teacher(s), students, and/or content beyond their school; support to develop student access to relevant technologies and related skills.
- **Mentoring:** Counselling and advising the students, establishing and monitoring effective study habits, including health and safety, and monitoring assessment, including proctoring tests where relevant.
- **Organizational Collaboration of Educators:** Collaborating with the distant teacher, other VS administrators, educators, and organizations to improve student learning in VS.

The brief description provided by the pre-service teacher was scored using the Site Facilitator Competence Rubric (SFCR). The rubric provided a framework to assess the pre-service teacher's response to the CAI and assign a score indicative of whether each pre-service teacher had acquired competence as a site facilitator. The rubric contained an explanation of each of the levels of competence for all three aspects (technology, monitoring, and collaboration) of VS competence as described above in the section curriculum lab tools. Examples corresponding to each of the competence level for all three aspects were also included.

This sample of 33 pre-service teachers' pre and post responses on CAI's scenario assessment were collated which gave a total of 37 open ended responses. These 37 open ended responses were scored using SFCR. The researcher and a doctoral student working in the area of VS scored these responses independently (each scored the selected 37 responses). The two sets of scored ratings were then tested for intra-class reliability. The intraclass correlation coefficient (ICC) calculated through this was .889 and was significant ( $p < .001$ ). This high result and accompanying high level of significance confirmed the high inter-rater reliability for SFCR.

The pre-test and post-test responses to the scenario were then scored as per the SFCR by the researcher. The scored responses were analyzed using one way ANOVA. The Mean pre-test scorings of the experimental group were compared with Mean control group pre-test ratings; similarly mean post-test ratings of the experimental group were compared with Mean post-test ratings of the control group. The results are shown in table 1.

*Table 1: ANOVA Comparisons of Pre-test and Post-test Scores Between Experimental (E) and Control(C) Groups on VS Competence Scores.*

Courses	Mean		SD		Std. Error		F	df	Sig.(two-tailed)
	E	C	E	C	E	C			
Pre-test	1.15 (n=26)	1.86 (n=22)	1.1 2	1. 47	.22	.31	3.63	46	.063
Post-test	3.07 (n=46)	1.11 (n=19)	1.4 4	1. 24	.21	.81	26.98	63	.000***

\*\*\* $p < .001$

The results show that there was no significant difference between the experimental ( $M = 1.15$ ,  $SD = 1.12$ ) and the control group ( $M = 1.86$ ,  $SD = 1.47$ ) at the pre-test,  $F(1, 46) = 3.63$ . However, after exposure to the TEGIVS curricula and resources, the experimental group scored significantly higher ( $M=3.07$ ,  $SD = 1.44$ ) than the control group ( $M = 1.11$ ,  $SD = 1.24$ ) at post-test,  $F(1, 63) = 26.98$ .

The high F-test score indicates that VS competence ratings as scored using SFCR significantly improved for the experimental group who interacted with TEGIVS curricula

prior to the post-test. The two groups did not show any significant difference at pre-test, but showed significant difference due to interaction with the TEGIVS curricula ( $p=.000$ ). Thus, the scoring as per SFCR revealed that compared to the control group that was not exposed to TEGIVS curricula before the post-test, the experimental group improved their VS facilitator competence (as scored by SFCR) after interacting with VS curricula. These findings indicate that the TEGIVS curricula were effective in improving VS facilitator competence as assessed by SFCR.

### **Conclusion and the Transfer to New Zealand**

The introduction of VS into pre-service teacher education was successful in the USA. The SFCR was found to be valid and reliable within the context of the TEGIVS curricula. The SFCR can be used to assess VS site facilitator competence in the three aspects of technology, mentoring, and collaboration. The TEGIVS curricula was found significantly effective in improving VS facilitator competence. Teacher education programs with an agenda to inculcate VS facilitation competence can adopt TEGIVS curricula and integrate it into their relevant teacher education courses with confidence of its ability to generate improved competencies.

These US resources in the 'lab tool' were trialled in New Zealand, but they were far from perfect. The CAI was not piloted. The Virtual Learning Network in New Zealand plays a large role in supporting and mediating the brokering of VS across schools. The images and particularly the voices of Americans were somewhat humorous to New Zealanders. However, the content was appreciated and students indicated in their feedback that they were pleased to have had their awareness raised and that they wanted to have the opportunity to engage more with VS in the NZ context. Therefore, further development of curriculum resources and research is planned. Professional development for teachers is also underway (Dabner & Davis, 2009).

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