

Consultancy Report

Effective, Efficient and Economical Distance Education Delivery Methods and Technologies for Rural Alaska



Abstract

Methods and technologies for distance learning are continually evolving. There have been a number of research studies conducted with distance learners regarding best practices and technologies, though there aren't many which include honest recommendations for the future of distance education in Alaska. This report is intended to assess the current situation and then highlight successes with the intention of providing accurate direction to those administrators and instructors who provide distance education to rural Alaskans.

The problems rural Alaskans face in education and in the community are not theirs alone, but shared with all rural communities across the arctic and worldwide. Thus, solutions for Alaskans are solutions for the world's rural and remote communities.

This report will identify the key stakeholders, analyze current technologies by looking at successes and failures and then discuss methods for potential changes in order to provide the highest quality education possible to rural Alaskans. This current, real-world situation is one that can benefit from assessment which will allow administrators and educators to become more informed about how to best provide distance education possible to rural Alaskans.



Time for Change

Students in rural Alaska have long since depended on formally trained educators for a quality post secondary education. The technologies available for teachers to deliver that education have changed dramatically over the years. Despite the availability and widespread adoption of modern communication and entertainment technologies in many rural and urban communities, quite a few educators and administrators are still relying on decades old means to provide an education to Alaska’s rural populations. It is possible that distance educators and administrators could begin using more advanced technologies, where appropriate, in order to improve the overall quality of distance delivered education in rural Alaska as well as student academic performance and the beneficial cohort/class mentality.

The qualities, technologies and methods of distance education are also important to rural communities worldwide. As seen in the Russian example (Figure 1), more students are taking distance education classes than ever before¹. This is also the case worldwide as internet

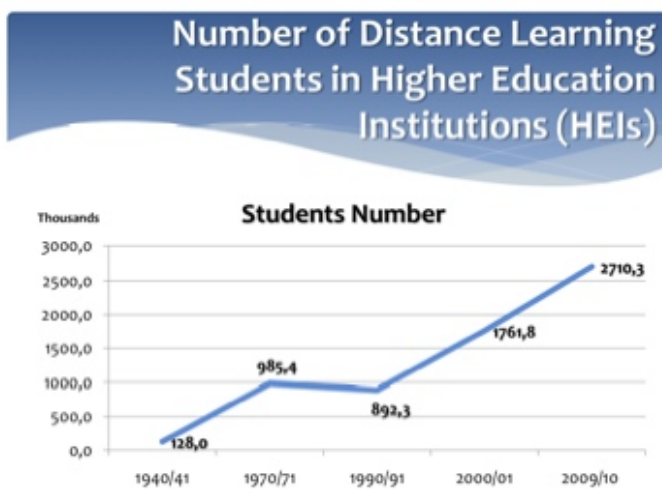


Figure 2 Students in Distance Education

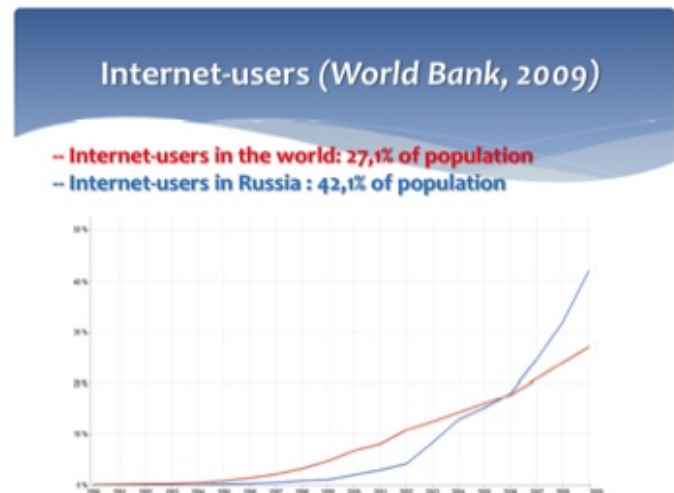


Figure 1 Internet Users in Russia vs. Worldwide

¹ (Smirnova, 2013)

connectivity increases.

With some careful planning, ideas and outcomes addressed within this report could be shared and adapted to the target audience, rural Alaskans, as well as other rural communities around the globe. An analysis of the various current technologies used for distance education will help to streamline and direct the development of future technologies and improve distance education overall.

Methods of Distance Education:

Asynchronous

The primary method of distance education from its inception centuries ago until just recently was asynchronous courses. These are courses that have specific readings, videos or assignments that the teacher provides for the student. The student is expected to do the assignments on their own time and return completed work on time. While the description of asynchronous delivery might sound similar to a typical class, one must remember that the student might never communicate verbally with the teacher and they might not even know of other students currently taking the same class. Often students only communicate with the teacher alone and often only receive one way lectures, whether it's via correspondence mail, television, radio, video, telephone or internet. We will discuss the advantages and disadvantages of those technologies later in the report.

One thought about asynchronous delivery methods is that the assignments and the transfer of knowledge from the teacher to the student might be somewhat similar to a live classroom,

though this method does not allow for quick or effective feedback and without the cohort or class mentality some students may struggle.

It's important to remember however, that there are students who prefer asynchronous courses. This is believed to be because the format allows them to participate in school, when and where they want. There are no frequent or necessary meeting times which works well for many students who have major responsibilities outside of school (work, children, etc).

Synchronous

A synchronously held class is one where instructors and students all meet at the same time and participate in a similar manner, either on the phone or at their computers (or in a classroom) generally with a telephone, microphone or headset as well as the keyboard for chatting. These

methods give both the students and instructors opportunities for the instant feedback and sharing of experiences and ideas not possible with an asynchronous course.

As stated earlier cohorts are important to academic performance, in fact it has been proven that both inter-student and inter-teacher relationships as well as student

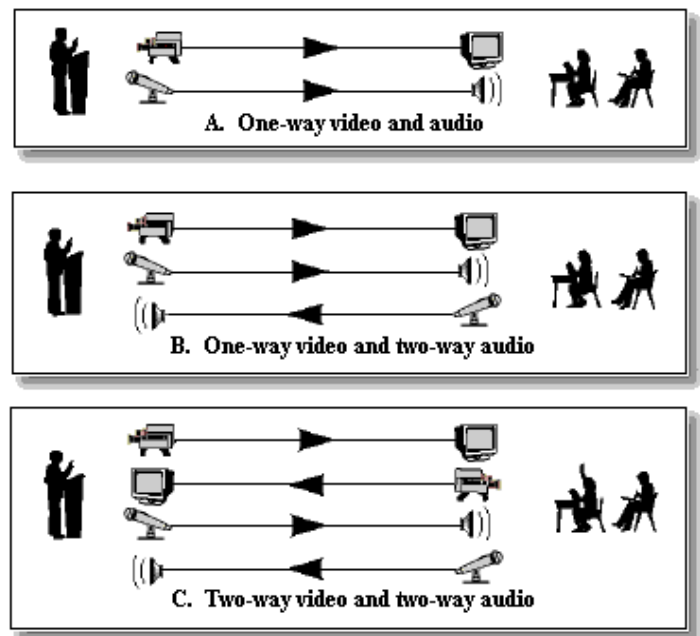


Figure 3 Various Methods of Distance Delivery

success are improved with cohorts².

At a recent meeting of rural and urban University of Alaska faculty, staff and students (Supporting and Advancing Geoscience Education (SAGE), Nome, Alaska, 3/20/13) almost everyone agreed that synchronous online distance education was vital to the future of rural education.

The benefits of synchronously taught classes are quickly seen by the students and teachers who depend on feedback and ideas to make sure the transfer of knowledge is successful.

With the information available and a look at current situations around the globe, it would seem that synchronously held classes should be the main focus of distance education in the future. In saying this, it must be noted that there are serious drawbacks towards full implementation of synchronously held distance learning courses. These disadvantages will be discussed later in the report.

Technologies of Distance Education:

Many technologies have been used in the history of distance education. Generally, those technologies have coincided with the latest communications technologies available at the time. Because technologies change and improve with the installation of new infrastructure in a community, the best option for distance delivery completely depends on where the students live.

² (Maher, 2005, Vol. 30, No. 3)

The University of Alaska Fairbanks currently uses a number of means to transfer knowledge to students in rural areas, the most often used methods include correspondence, telephone/teleconference as well as synchronous and asynchronous online.

In the following chapter I will discuss the 3 primary technologies (correspondence, online, teleconference) currently used as well what tools could be used in the future.

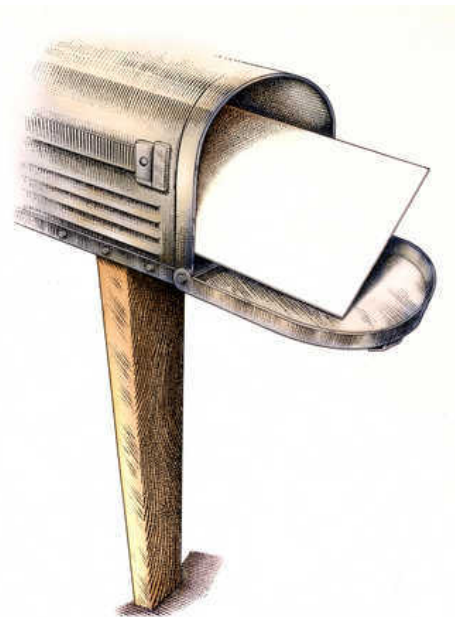
Correspondence

Method

Correspondence mail is a method of distance delivery still being used today by the UAF department of eLearning and Distance Education³. Teachers in other departments also use the mail to deliver materials that students need for class. Bookstores also use the mail to distribute required readings for distance courses.

Correspondence courses are only offered asynchronously, which offers very little or very delayed peer review or feedback. Typically a printed guide with lessons for the entire semester are included in the packet mailed out to students. Other materials sent can also be sent out including lab kits, computer software, books, DVD's, etc.

One of the benefits of correspondence asynchronous schooling is that students are able to complete a course at their own pace. This can be helpful to those students who have children,



³ (eLearning & Distance Education, 2013)

jobs or other responsibilities during the day. One of the disadvantages is the time it takes to send questions, assignments and tests as well as receive feedback on completed work.

Infrastructure

United States Post Offices have been serving villages throughout parts of rural Alaska since the 1800's and a delivery route was established to Nome in 1901⁴. The US government continues to maintain the mail service and can guarantee the delivery of mail to some of the most remote communities in the state. The availability of post offices in rural communities is a benefit to distance educators.

The disadvantages of the mail service, as noted earlier, is the time involved in sending questions, tests and assignments between students and instructors as well as the lengthy waiting period necessary to receive feedback on schoolwork. There is also a cost involved with submitting work via correspondence mail, currently a standard stamp is 46 cents. Depending on the amount of assignments and tests sent during a semester there could be minimal costs associated with submitting and receiving assignments.

Telephone

Method

Since the 1980's telephones have been used as one of the primary methods of the University of Alaska for delivering distance education. Telephone classes are generally led by the instructor over a teleconference in which students listen to the lecture as well as sharing thoughts,

⁴ (Rural Delivery Service, 2013)

assignments, etc. Telephonically delivered classes are synchronous, although with recording technologies, students who miss live classes are able to listen to a recorded classes at a later time. Unfortunately due to the nature of a synchronous class students who do miss a class are unable to add their input, questions or comments to the discussion between the instructor and other students.

Like correspondence classes, telephone classes are generally taught with printed and digital media aides. It is often up to the student to find their own means of obtaining the media whether it is purchased through a bookstore, found in a library or downloaded from an online source (email, Blackboard, etc).



Technologically, the methods for teaching a course telephonically have changed very little over the past 30 years.

Infrastructure

Like post offices, telephones have been in rural Alaskan communities for decades⁵. Into the 2000's, telephones were found in the majority of homes in Alaska, even in rural communities (only now being removed due to replacement by a mobile phone). There are some benefits a telephonically offered course has in comparison to internet delivered classes. Because of their longevity and broad acceptance in rural communities, students often do not have a problem

⁵ (Parker, 2008)

finding a landline to use to connect to class. Also because of their commonplace, students generally have the technological knowhow to operate a phone and use it properly so as to actively participate and not to disrupt a class.

The costs of a telephone course are actually much higher than those of a correspondence course, but quite a bit lower than an internet course. A typical telephone bill for a month of service could be approximately \$30 in a rural community which would have to be paid by the student. The University currently pays for the call, which is toll free for the student. The University also has to pay its phone bill which must accommodate a teleconference bridge and likely costs a lot more money. The teleconference equipment and recording services also have a significant cost associated with them.

Internet

Method

The internet was invented as a tool for universities to communicate⁶, since then it has continued to be very closely linked to education. There are many benefits as well as disadvantages to using the internet as a method for delivering a quality distance education.

One of the benefits of online distance education is the versatility of programs available on the internet.

⁶ (History of Internet, 2013)

Online courses can easily be held asynchronously, with huge advantages over correspondence asynchronous classes, specifically because the transfer of questions, comments, tests and assignments can be done instantly and feedback will only take as much time as necessary for the student or instructor to respond. This speed of feedback will greatly improve a students' academic performance because they won't have to wait days or even weeks to find out if they are doing their work correctly. Open forums are also a commonly used online technology which improves the cohort experience, allowing students to effectively communicate with each other on their own time.



Synchronous classes are also easily held online and as software continues to improve, so too does the virtual classroom. There are a number of programs available to hold synchronous online conference classes including Adobe Connect, Blackboard Collaborate (formerly Elluminate Live), Google Hangout, Microsoft Live Meeting, etc.

There are some major issues students, faculty and administrators have to deal with when considering online conference software including video and audio quality, student scheduling, bandwidth restrictions, willingness to engage and learn new software as well as distantly dealing with hardware issues⁷.

⁷ (Julian Prior, 12)

There are also major advantages associated with using online conference tools for class. One advantage of holding a synchronous online class is the ability of the student and the instructor to get instant feedback, like a physical classroom, which can improve the teacher's ability to teach and the student's ability to learn. The instantaneous nature of the class also allows tangential conversations to happen, new unplanned topics can be discussed and innovative, collaborative thoughts and ideas can occur. The entire class can participate in this live learning experience by contributing audio, video, text (via chat screens) or images on the main screen. The online synchronous class is as close to an actual classroom as possible (with the possible exception of two-way TV) without being in a physical classroom. Synchronous classes can also help students with learning disabilities such as ADHD because it allows for the flow of information through a variety channels, ensuring that students will have something topic related to focus on during class.

The cohort experience of a synchronous online class is possibly the best compared to all other methods of distance education delivery. Students are able to communicate with each other independently during class through text, they are also able to communicate with the class as a whole with text, video or audio. They can also present websites, drawings, or other demonstrations they have prepared, live and in front of the class. The class and instructor can give instantaneous feedback allowing for an enhanced learning environment and improved academic performance by all participating students. Synchronous online classes can benefit an instructor who can use the participating student list to see who is in attendance as opposed to lengthy roll calls used during teleconference classes, this leaves more time in a class for actual

teaching. Instructors can also ask for a (virtual) show of hands or feedback when discussing topics, asking questions, ensuring that the objectives of the class are being met.

Infrastructure

Unfortunately, infrastructure, hardware and associated costs are the most restricting factors of synchronous or asynchronous online distance education. The student must have access to a computer which can cost between \$300-\$1000, they must also have a reliable internet connection which in rural communities can cost as much as \$150 per month (with overage fees of hundreds or even thousands of dollars per month⁸). For students taking synchronous online courses, the internet connection doesn't just have to be reliable, but to allow for smooth reception of video, audio and images it must also have higher bandwidth which isn't yet available in much of Western and Northern Alaska.

The University also must also spend a significant amount of money up front for internet bandwidth, computer servers, software licenses, technical training, as well as online instructional architecture, design and development.

There is a lot of infrastructure necessary to make sure the whole online educational environment runs smoothly and unfortunately in many rural communities the necessary equipment does not exist or is outdated and will not work with continually changing technologies. The challenges of troubleshooting software and hardware issues in rural communities could also be a factor in the resistance of the university system towards total implementation of online distance education.

⁸ (Bendinger, 2012)

Review

The following chart reviews advantages and disadvantages of a number of technologies used for distance education. This chart, created by the Florida Center for Distance Education in 2009, only briefly touches on infrastructure costs, and abilities of a technology to transfer information to the student. There have been significant improvements in some distance education technologies made since 2009 which might not be included in this chart.

	Advantages	Disadvantages
Print	Materials Inexpensive Portable High comfort level Readily available	No interactions Limited sensory involvement Requires reading skills Time delay
Voicemail	Low cost Easy to use Increases interactions	Length may be limited No visual cues May involve toll charges
Audio files/CD	Inexpensive Easily accessible Easily duplicated	No visual cues No interaction
Audioconference	Inexpensive Easy to set up	No visual cues No interaction Requires hardware
E-mail	Flexible Interactive Convenient	Requires hardware Software variations
Online Chat	Real-time interactions Instant feedback	Requires similar software Must be scheduled Requires hardware
Web-based Education	May incorporate multimedia Worldwide access Interactive	Requires computer Requires Web access May be slow
Videotape/DVD	Inexpensive Easily accessible Easily duplicated Audio and visual elements	Complex to record No interaction Requires hardware

Satellite Videoconference	High realism May be interactive	Expensive hardware Must be scheduled Usually one-way only
Internet Videoconference	High realism May be interactive Relatively inexpensive	Must be scheduled Small windows Slow, jerky video
Cable/Broadcast Television	Easy to use Easily accessible May be videotaped Includes audio and visual	High production costs Requires hardware No interaction Must be scheduled

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Figure 4 Comparative Analysis of Distance Education Technologies

Recommendations for Distance Education:

Quality distance education is vital to the sustainability of rural Alaska. It is important that people from rural areas are capable of receiving the necessary education required to develop their communities in accordance with traditional values, cultural respect and environmental concerns. Distance delivery has been used by the University of Alaska for decades and continues to improve along with the implementation of modern technology infrastructure in rural communities.

When deciding what modifications or improvements the university system should make to its distance education program, many factors must be considered. This report was intended to inform key stakeholders (the administrators, faculty and students) about what distance education technologies were currently available, what their advantages and disadvantages

⁹ (Florida Center for Instructional Technology, 2009)

were, and recommend what changes could be made to provide the best education possible to rural Alaskans.

The previous sections and review covered the available technologies as well as the advantages and disadvantages, however there were no recommendations made for the future. It is difficult to make recommendations based on the continuously changing communications infrastructure being installed in rural communities. Despite this fact, a few key features which were found to contribute to a quality distance education were highlighted in the report. Using these qualities, it seems that a recommendation can be made.

In 2011 and 2012, with a significant amount of federal stimulus funding, General Communications Incorporated (GCI) began to modify their TERRA terrestrial based broadband network to include all of Southwest Alaska. Along with the TERRA project, GCI also began to install mobile communication networks in many rural communities across the state. With those in place, communications in many Southwest communities have already changed dramatically. According to media reports, GCI is also now beginning to roll out their TERRA network in the states northern and western communities, meaning that within a year the entirety of the state should have access (not necessarily affordable) to a reliable high-speed internet connection as well as a quality mobile phone connection.

With that in mind, it would make sense for the University of Alaska to hold off on any major improvements to the distance education program until the TERRA network is complete. At that time, the newest technologies can be once again reviewed to see which would best fit into the current UA system. Factors that should be looked at include ease of use, adaptability to

communication and hardware issues, quality of virtual classroom and cohort experience as well as overall costs associated both to the student and the university.

In the mean time, it would be beneficial to offer basic training to faculty and students to prepare them for the bigger changes that will eventually be implemented. There are currently opportunities for faculty to learn more about distance education in the UAF iTeach program¹⁰ however this training could potentially be too technical for an instructor who has never before used an online technology for teaching.

It could be much more difficult to train rural students who potentially have little computer experience. This could be done by designing a college preparedness course which could be required for all degree seeking students and would be offered via distance delivery so that one of the first courses a student completed in their academic career was one which led them, step by step, through the various tools that will eventually be used throughout their distance education including Webmail, Blackboard, UAonline, Collaborate, etc.

In the future, when the infrastructure allows, students and faculty will benefit from moving distance delivered courses entirely online. The choice of taking a synchronous or asynchronous course would still have to be made based on the students responsibilities outside of the classroom (work, children, etc.), that decision cannot be made, only supported, by the university.

¹⁰ (iTeach, 2013)

A number of public and private entirely online universities have recently began competing for University of Alaska students (Phoenix, Western Governors, etc.). This also must be considered by the UA administration when deciding how to improve the distance education program. If a school from another state can offer the same education or better for a lower price or even free, how will the University compete? Will the University compete?

These are questions that need to be answered now and a strategic plan must be drawn up involving all stakeholders in order to ensure that the University of Alaska continues to progress while following its mission statement: *“The University of Alaska inspires learning, and advances and disseminates knowledge through teaching, research, and public service, emphasizing the North and its diverse peoples.”*

Additional Information:

- <http://www.aklearn.net/>
- <http://distance.uaf.edu>
- www.adn.com/2011/09/11/2062244/web-partnership-could-help-improve.html
- <http://terra.gci.com/news-and-announcements>
- http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=EJ789384&ERICExtSearch_SearchType_0=no&accno=EJ789384
- <http://uhcc.hawaii.edu/distance/courseTypes.php>
- http://translate.google.com/translate?sl=auto&tl=en&js=n&prev=_t&hl=en&ie=UTF-8&eotf=1&u=http%3A%2F%2Fwww.kamgu.ru%2F
- <http://www.intechopen.com/books/authors/international-perspectives-of-distance-learning-in-higher-education/-distance-learning-modern-approaches-to-engineering-education->
- http://www.ifets.info/journals/10_4/1.pdf
- http://www.wgu.edu/about_WGU/WGU_different

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