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# Distance Education and Technology Infrastructure: Strategies and Opportunities

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# Distance Education and Technology Infrastructure: Strategies and Opportunities

**Robert L. Moore and Brian P. Fodrey**

**Abstract** Distance education provides a wealth of opportunities and areas for innovation, but it also presents unique challenges for implementation and eventual success. To mitigate these challenges, this chapter will present four critical components—systems, objectives, evaluation, and personnel—that combine into one to create a technology infrastructure that can support distance delivery. Through this chapter, e-learning leaders will gain the knowledge to not only identify key features of tools used for distance delivery, but also understand and appreciate the correlation between a holistic infrastructure approach and quality distance delivery. The absence of one of these critical components will likely result in an unsuccessful technology integration. To aid in the explanation of these critical components, the chapter will focus on three main distance education delivery forms—webinars, classroom captures, and e-learning modules. The chapter will provide an overview of the types of questions and elements that should go into consideration of any distance education tool, and will aid in the effective assessment and evaluation of these tools, as well as personnel considerations that should be taken into account.

**Keywords** Technology infrastructure • Web conferencing • Webinars • e-Learning modules • Instructional design • Distance education • Evaluation • Classroom capture • Interaction

## Decision-Making Guidance

This chapter will help you make decisions about developing your institution's IT infrastructure, and after reading the chapter you will be able to:

- Understand the relationship between software tools and systems as it relates to distance delivery

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27 • Identify the key features of tools for distance education content creation
28 • Evaluate and select the most appropriate software and systems for distance
29     delivery

## 30  What You Need to Know

31 Distance education is a rapidly growing segment of higher education as more and
32 more students are pursuing degrees, training, and certifications in this format. Ozkan
33 and Koseler (2009) identify this tremendous growth and the "trend towards location-
34 independent education and individualization [as a motivation for] universities to
35 invest their resources on developing online programs" (p. 1286). Previously, dis-
36 tance education was seen as a peripheral alternative or one that was not the focal
37 point of many of our more traditional universities, but that too has changed.
38 Simonson, Smaldino, and Zvacek (2015) explain that distance education is seen as
39 a viable option for many learners and is actually the preferred method of receiving
40 instruction for many of them. This is further evidenced by the most recent enroll-
41 ment numbers provided by the National Center for Education Statistics. They report
42 that in fall 2013 over 5.5 students were enrolled in distance education courses at
43 degree-granting postsecondary institutions. In that same year, over 2.6 million, or
44 15.1%, of undergraduates enrolled at degree-granting postsecondary institutions
45 took at least one distance education course, and almost 2 million, or 11.3%, did a
46 fully online program (National Center for Education Statistics, 2016). As more data
47 becomes available, one would expect to see the number of students taking fully
48 online programs to continue to increase along with the number of students who take
49 at least one online course during their postsecondary careers.
50     However, the quality of instruction cannot suffer, and instructional designers are
51 often faced with the challenge of providing support for faculty while simultaneously
52 managing new content delivery tools. At the management level, administrators are
53 tasked with aligning institution resources to the most effective and efficient models
54 for distance education delivery. But with so many options, it can be a challenge to
55 identify exactly which is the best fit for an institution. Administrators need to under-
56 stand that distance education is more than simply posting a copy of a PowerPoint
57 presentation online; students want interaction both with their peers and with the
58 instruction. Students also look for rich educational experiences from the location of
59 their choosing.

## 60  *A Model for Technology Infrastructure*

61 Just as interest and enrollment in distance education courses has grown exponen-
62 tially, a similar growth has been seen on the technological side. Two areas—mobile
63 and e-learning in particular—have direct implications for distance education (Balch,

2014). Bosch, Hartenberger Toby, and Alkhomsi (2015) point out that these innova- 64
tions now have "educators trying to find any channel possible that can deliver qual- 65
ity education and interactions to people at a distance" (p. 137). In meeting this 66
demand, e-learning leaders must determine the most effective and efficient ways to 67
deliver their instructional content. As these leaders seek to meet needs, they need to 68
manage multiple stakeholders and interests. Paul and Cochran (2013) identify the 69
four components of institution, student, faculty, and technology as essential for dis- 70
tance education. Taken individually, these components are critical, but "the larger 71
risks and rewards for online education occur where these components intersect" 72
(Paul & Cochran, 2013, p. 50). These components provide a useful framework for 73
an institution-wide view of distance education. But within the information technol- 74
ogy (IT) divisions that are tasked with supporting distance education initiatives, 75
there is a need for an effective way to identify, evaluate, and implement tools that 76
can support distance education and the organization's instructional mission. 77
Alsabawy, Cater-Steel, and Soar (2013) explain that "IT infrastructure services [are] 78
a critical factor which affects the [institution's] activities [as it relates to distance 79
education]" (p. 431). This IT division-level framework is what will be referred to in 80
this chapter as the technology infrastructure, the four components of which are dis- 81
played in Fig. 1. 82

Each of these components are required for any distance education technology 83
infrastructure, and the absence of one component will likely result in a less effective 84
implementation of distance education services. There is not a specific order for this 85
model which aligns with how projects may be initiated. For instance, a faculty 86
member may express an interest in using GoToMeeting, a web-based video confer- 87
encing tool, which would be in the *systems* part of the model. The IT Division would 88
next need to find out the faculty member's learning objectives, determine how or if 89
GoToMeeting is able to meet those needs, and evaluate how it will work within the 90
enterprise environment of the institution. Finally, the division will need to deter- 91
mine if it has the personnel who can support this new tool, both in terms of training 92
the faculty member but also potentially for live-event support (if that is required). 93
This is just one of many examples of ways that this model can work within the IT 94
Division. 95

*Systems.* There are two aspects of interest within the systems component. The 96
first is what format or delivery method you are using to create your instructional 97
content, and the second is what platform or tool you will use to deliver this content. 98
We begin with the first aspect, which is the format and delivery method. Although 99
there are many permutations and definitions of distance education delivery meth- 100
ods, we will focus on webinars, classroom or lecture captures, and e-learning mod- 101
ules (Table 1). 102

In this chapter, the term *webinar* will be used to refer to a synchronous recording 103
that features some level of direct interaction with the instructor and students and 104
which can be recorded and archived for on-demand access by students. These syn- 105
chronous recordings are delivered using a web platform and originate from the pre- 106
senter's laptop or desktop. They will include audio and visuals (typically in the form 107
of PowerPoint slides), and may also include video of the presenter. Students will 108

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**Fig. 1** Four critical components for technology infrastructure
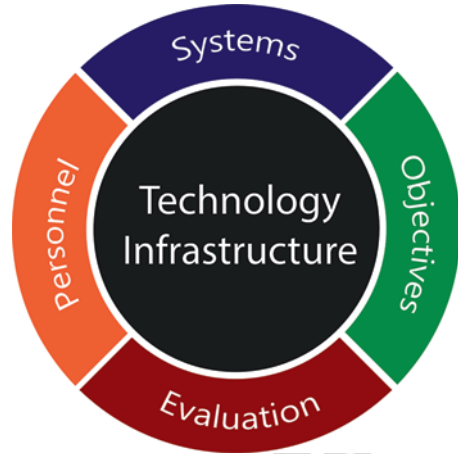


view these real-time recordings using their laptop or desktop computer. The instructor may decide to leverage small groups, usually termed a *breakout room*, to allow students to have more student-to-student interactions during the webinar. In the live event, students will be able to answer any poll questions posed by the instructor providing immediate feedback to the instructor and also ask questions of the presenter using text-based chat. Typically, a webinar will run from 60 to 90 min.

Classroom or lecture captures are meant to be exactly what their name implies—a digital representation of what happened in the classroom. They are meant to capture what information was transmitted via the teacher in a classroom setting but will not feature many of the collaborative elements of a face-to-face classroom such as small group work. Similar to a webinar, a classroom capture offers the opportunity for a synchronous session that can also be recorded and archived and later provided to students for asynchronous viewing. Capturing a lecture for students is a helpful study and review tool. These captures can be accessed by students interested in studying or reviewing their own notes after the class session. The length of a classroom capture will vary, but can be understood for the purposes of this chapter as being a full class session—from 45 min to 3 h. It would be presented to students as one long recording, similar to what their experience would be within the classroom. Instructors will be able to offer polling during the synchronous version but should be aware that if video is being used there may be a latency issue or delay in transmission, which makes real-time polling difficult.

Of the three delivery options, e-learning modules are typically the most labor-intensive option for faculty to create and deliver. This is often due to the fact that an e-learning module is self-paced and is meant to provide not only instruction, but also opportunities for student interaction. This can take the form of quizzes or interaction with the content on the slide, such as clicking on boxes to reveal information. With e-learning modules, the feedback is instant, whether that is from a quiz being marked correct or incorrect and receiving additional feedback or by having to use a drag and drop exercise to correctly position a list or objects. The modules will have

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**Table 1** Overview of different delivery options

| | Webinar | Classroom captures | e-Learning module |
|---|---|---|---|
| Synchronous | Yes | Yes | No |
| Asynchronous | Yes | Yes | Yes |
| Student interaction | Yes | Yes | Yes |
| Student to student interaction | Yes | No | No |
| Student to faculty interaction | Yes | Yes | Limited |
| Real-time polling | Yes | Yes | No |
| Real-time question and answer | Yes | Yes | No |
| Typical length (in minutes) | 60–90 | Varies | 15–35 |

a customized look and feel to match the subject matter and will have engaging content including animations and audio. These modules do not have a real-time component, and the interaction will be designed by the instructor, with students completing it at their own pace and time. The results of the quizzes may be reported to a learning management system (LMS) if SCORM or some other type of tracking (http://scorm.com/scorm-explained/) has been enabled and is supported by the LMS. For more information about LMSs, refer to the LMS chapter within this book. In these e-learning modules, students will receive their instruction using a web-enabled device that may include their laptop or mobile device such as a tablet or iPad. Since these are self-paced instructional materials, students will be interacting indirectly with their instructor. The instructor may include quiz questions with immediate feedback provided, but there will not be opportunities for real-time question and answer or polling such as with classroom captures and webinars. Typically, these modules will take between 15 and 35 min to complete.

The second aspect for systems is how the content is being delivered, and this is where the specific tools come into play. Many of these tools you may already be familiar with, including Adobe Connect, GoToMeeting, or WebEx. Preset and Andrews (2015) provide what they call the "magic quadrant for web conferencing" (Fig. 2), which organizes the various tools into four quadrants of leaders, challengers, visionaries, and niche players.

Present and Andrews define leaders as those who "have achieved significant market share relative to their competitors … [and] have robust, scaled products with a wide range of features," and they continue to explain that these leaders "are doing well today and are prepared for the future" (p. 16). Cisco, Adobe, Microsoft, IBM, Citrix, and AT&T are all found in this leader's category. Challengers are defined as being companies which "are characterized by operational excellence and good standing in the market … but do not have long-term roadmaps or their products lack some features" (p. 16). Interestingly, Google falls into this category according to Preset and Andrews. The visionaries quadrant, which includes companies such as Zoom, Fuze, Vidyo, PGi, and West Unified Communications Services, is defined by companies that "have important, unique and/or well-developed technical capabilities, and provide key innovations that illustrate the future of the market … [but] have not yet developed the sales and support capabilities to address or influence the

171 whole market" (p. 16). Finally, the fourth quadrant is for niche players which are
172 defined as "[having] good technology, but are limited by their service, breadth of
173 product line … [and] some have chosen a niche strategy" (p. 17). Companies within
174 this quadrant include LogMeIn, Arkadin, and Blackboard.

175 *Objectives.* Moore (2014) states that it is imperative that technology supports
176 instruction. Too often, a fun or new technology tool is added to a course before it has
177 been carefully reviewed and vetted. This can often lead to frustration from both the
178 students and instructor. It is critical to establish clear learning objectives and to align
179 these with the technology tools that are selected and implemented. It will also be
180 easier to evaluate the tools if you understand what you are trying to accomplish. For
181 instance, an instructor may feel that students need a solid foundation in specific
182 concepts before they can move on to higher levels of application and critical think-
183 ing. In order to meet this need, an e-learning module may be developed that covers
184 these fundamental concepts, and it may then be published and distributed to stu-
185 dents using Adobe Connect. Within the module, there would be knowledge check
186 quizzes, and the instructor could link these scores to the LMS. This would allow for
187 an effective evaluation of the e-learning module. Conversely, if the instructor was
188 given a tool that is suited for classroom capture to develop this e-learning module,
189 it would fail to meet the learning objectives. Thus, it is important to properly align
190 the technology to the learning objective.

191 *Evaluation.* There are two parts to evaluation within this model. There is the
192 initial evaluation of the particular tool or service that is going to be used for the
193 distance education option. Furthermore, there is also the continuous evaluation that
194 must happen after the implementation. Ozkan and Koseler (2009) explain that
195 "assessment has become an essential requirement of a feedback loop for continuous
196 improvement but often this is overlooked by the IT division" (p. 1286). In many
197 scenarios, the tool or service is deployed to the institution and then the IT division
198 moves on to the next project. In this scenario, the IT division fails to develop a
199 mechanism for evaluating if this solution is continuing to meet the needs of the
200 institution. The evaluation that IT should be responsible for is how the technology
201 is meeting the stated objectives for the course. This may require engaging with the
202 faculty members to provide instructional objective feedback to compare with the
203 technical evaluation and assessment that the IT team can provide. Together, this
204 feedback loop will make sure that the technology is meeting the instructional needs.
205 The rapid advances in technology make it critical that solutions and tools are under
206 constant review and consideration. Preset and Andrews' magic quadrants demon-
207 strate that there is quite a bit of fluidity between the levels, and while one may have
208 chosen a tool from the leader's quadrant, a challenger or visionary company may
209 actually be able to better meet the needs of the institution in the future.

AU4 207

210 *Personnel.* Personnel is an important requirement for technology infrastructure.
211 Higher education institutions are driven by providing instruction. One of the ways
212 to help align technology with instruction is through the hiring of an instructional
213 designer. This instructional designer can serve multiple purposes. First, they will be
214 able to work with faculty on integrating technology into their instruction and align-
215 ing technology to learning objectives. Just as faculty are subject matter experts in
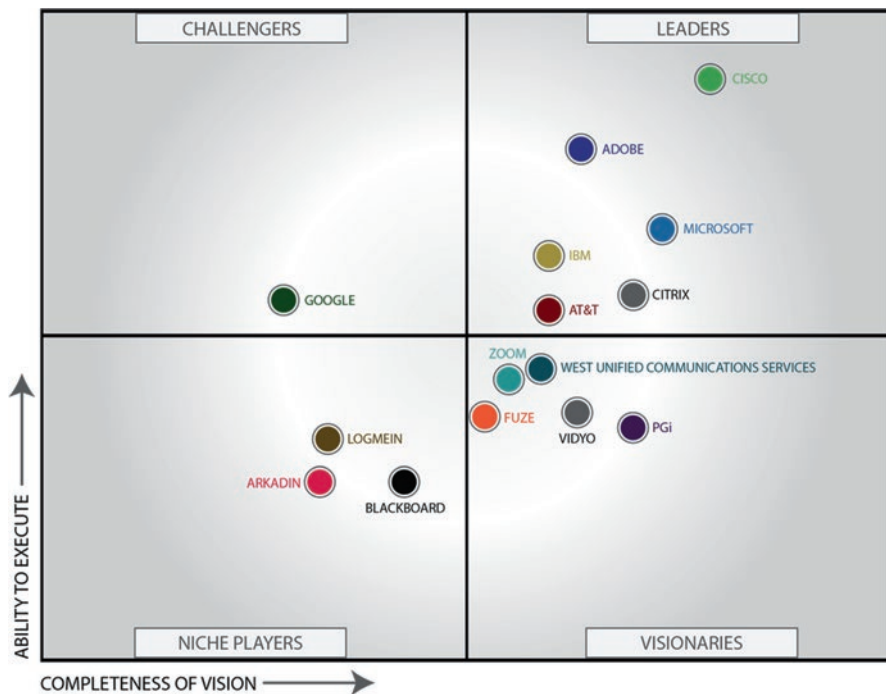
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**Fig. 2** Magic quadrant. Adapted from Preset and Andrews (2015)

their field, an instructional designer is a subject matter expert in integrating technol-  216
ogy into instruction. For some faculty who are not as experienced with technology,  217
this support will be beneficial; for other faculty, the instructional designer can help  218
them think of new ways to be innovative in the classroom. Additionally, the instruc-  219
tional designer will be able to interface with the technical personnel within the IT  220
Division. Consider an LMS. There is the actual installation and maintenance of the  221
LMS—things such as backups, updates, and patching—that is well suited for a  222
LMS administrator. But that LMS administrator may not know which of the forum  223
tools is best suited for instructors and students, or may not know how quizzes should  224
be delivered within the actual course. These pedagogical decisions that are technol-  225
ogy based are best addressed by the instructional designer. Having these two skill  226
sets within the same IT division team allows for a more holistic support structure  227
and will make the technology infrastructure more sustainable. It will also feed into  228
the learning objectives and evaluation components as it will provide the people  229
through which to accomplish these two critical steps.  230

## What You Can Do

Now that you have been furnished with a model for technology infrastructure and understand the terminology, it is time to discuss how to actually evaluate the various tools that are available for use. We could provide specific tools and an evaluation of those tools, but that is a limiting exercise. Each institution will have different needs and factors that will influence these decisions. Therefore, we will discuss what things to look for when evaluating different tools. By focusing on the *process* of the evaluation, it will make this more applicable to a wider audience. These are merely suggestions informed by the experiences of the authors in building technology infrastructures and best practices from other practitioners. These are meant more as guideposts to get you started on developing your own institution-specific evaluation that will cater to those needs. We will focus again on the three delivery options previously defined—webinars, classroom or lecture capture, and e-learning modules. The following sections provide guiding questions for each delivery option that will help make the selections.

## *Webinars*

When evaluating options for webinars, there are six key questions that you will want to answer.

### How Does the Solution Handle PowerPoint or Keynote Animations?

PowerPoint is the tool most faculty are familiar with, and typically how they will organize their content. For those using Mac-based computers, they may be using Keynote, which offers similar presentation functionality to PowerPoint. During the webinar, the faculty will want to present their content and have the participants be able to follow along. Although there are many options for how to deliver your webinar, from a Google Hangout to a GoToMeeting session to Adobe Connect, a key distinction will be in how animations are handled. Adobe Connect will be able to handle PowerPoint animations, but other tools, such as Blackboard Collaborate or WebEx, will create static images of each slide that will not allow for animations, such as bullet points appearing on mouse click. These tools can provide a workaround in allowing the instructor to share their screen which is running PowerPoint on the local machine, but this can present latency issues.

## What Type of Participant Interaction Is Needed? 262

We have all sat through a webinar that was nothing more than a talking head and 263
know how painful that experience was as a participant. Good instructional practices 264
mean that there will be participant interaction during the webinar and the different 265
tools will handle this differently, if at all. Here is where the learning objectives come 266
into play. If the instructor attempts to employ webinars as a means of doing a review 267
session, they may have different needs than if they are trying to use webinars as a 268
way to replace a face-to-face class session. The way that the participants interface 269
with the instructor and each other may differ. At the time of this publication, some 270
tools, such as GoToMeeting or WebEx, did not provide comparable polling features 271
to ones offered by other tools, such as Blackboard Collaborate and Adobe Connect. 272
Another part of participant interaction are breakout rooms. Some tools allow for a 273
session's participants to be moved into their own virtual breakout rooms where they 274
can collaborate and have private discussions similar to how a face-to-face class may 275
have small group work; other tools do not have this component. 276

## How Much Customization Can Be Done for the Layout? 277

Some tools provide a default layout that has a space for the participant list and text-278
based chat and then the display of either a shared desktop screen, whiteboard area, 279
or PowerPoint slides. This may meet the needs for most faculty, but others may want 280
the ability to change layouts and add in different components such as video files or 281
other multimedia components that can help engage the learners. 282

## Can You Save Your Room Configurations? 283

For instructors who are looking to do webinars on a regular basis, such as replacing 284
a weekly face-to-face class session or teaching a fully online course synchronously, 285
being able to save their room configurations is a huge benefit. This connects with the 286
previous question on customizations. If the room can be customized to have the 287
widgets and tools that are needed, but it cannot later be saved and the faculty mem-288
ber must do this setup before each meeting, this will be frustrating and inefficient 289
for the faculty member. The additional setup time may dissuade them from either 290
using these additional components that could better engage learners or not want to 291
use the tool at all. 292

## How Many Learners Can Connect? 293

Most webinar solutions are based on *connections* to the room. These connections 294
may be referred to as users, learners, or participants, but these all mean the same 295
thing. It will be important to look at what the average class or session size and use 296

297    that to determine which package to select. Each class meeting would be considered
298    a session, and you will want to check how many connections are allowed per ses-
299    sion. For example, if these webinars are for online courses that have an enrollment
300    cap of 25 students, there is no need to pay for a room that allows for 100 connec-
301    tions as this can become cost-prohibitive when you try to scale up to support more
302    online instruction. It is important to distinguish between how many people are con-
303    necting to the webinar versus how many are actually going to be watching it. If each
304    student is signing in from their own computer, those are many individual connec-
305    tions. However, if students or participants may be meeting in groups and using a
306    projector in a conference room to project the webinar, you would only be counting
307    that single connection, not everyone that was in the room.

308       For licenses, vendors typically do not place limits on the number of times you
309    can use an existing room during the license terms. In other words, if you pay for a
310    50 seat room, you would be able to use that room as many times as you wanted to.
311    The limitations are typically in concurrency of usage. This means that while you
312    may reuse your room URL as many times as you want, you can only host one meet-
313    ing at a time per room URL. When recording is an option, most solutions will create
314    a new URL for just the on-demand version which is different from the original room
315    URL. At the author's institution, Adobe Connect is used for webinars and instruc-
316    tors use one main room for all of their webinars. The webinar room has a standard
317    configuration for questions, polling, and other features, and then each webinar's
318    slides are loaded into the middle area. After recording the meeting, a new on-
319    demand link is automatically created by the system allowing viewers to see the on-
320    demand version and the reuse of the original room URL.

321    **Do You Have the Ability to Host or Store Content?**

322    Some of the webinar tools do not provide long-term storage options or have storage
323    as an additional expense in addition to the fee to use the webinar tool itself. If con-
324    tent is being created for a course, this may be an important factor. Some tools, such
325    as Adobe Connect, provide unlimited storage of content during the length of the
326    contract. You will also want to consider what type of export options you will have
327    for recorded content in case you need to move services or want long-term storage.
328    Some tools, such as Blackboard Collaborate and Adobe Connect, provide included
329    export of recordings but may require specific playback players or have a loss in
330    quality on these downloads. Thinking about what you want to do with the content
331    after you have recorded it as part of your tool evaluation process will help avoid
332    potential mismatches between needs and expectations with faculty. The last thing
333    you want is for a faculty member to expect the content to be available for an entire
334    semester but your tool only allows for 30 days of storage.

335       The licensing agreement that you have with your host provider will address
336    many of these issues. Most vendors will offer annualized pricing that is cheaper
337    than paying per month. It is important to check with your system office or central IT
338    to find out if there are any preexisting web conferencing contracts. If not, each

vendor should offer a higher education pricing that is different from the normal price points. Verifying the storage parameters and also how to export and move information from the host server to a local or different server are all things to look at when evaluating potential third-party service providers.

## *Classroom or Lecture Capture*

Many of the same questions for webinars will also be applicable for evaluating classroom or lecture capture tools, but there are a couple that are specific to this delivery medium.

### Is There Specific Hardware Required in Addition to the Capture Hardware?

For some tools, such as MediaSite, you may need to have a physical, vendor-specific recording appliance that simultaneously captures the video of the presenter and the PowerPoint slides. Other tools or solutions may capture the video using a simple webcam and software running from the presenter's computer. There are pros and cons to both approaches and associated costs that will help narrow down the options based on your specific needs.

### Is There a Livestream Option?

For some tools, learners can watch a livestream or webcast version of the presentation which can be helpful if students are not able to physically convene in the same location. However, there may be some latency issues with the livestream which limit the ability to use interactive features such as polling. With MediaSite, the authors have observed as much as an 8 s latency delay between a livestream and what is actually happening in the classroom; such a large latency period makes polling with livestream attendees impossible. Another factor to consider will be the network connectivity of those watching the livestream. If they are on slower connections, the latency period could be much higher and may impact their satisfaction with the livestream; if students are not able to reliably watch the classes, they will not be able to actively participate in the class and learning will suffer.

### How Easily Can You Export Content and Use It in Different Locations?

All of the tools will offer a playback player that will show the recorded content, but many will not export the content in a format that would be supported by another application. Thus, moving from a tool such as Echo360 to MediaSite could be incredibly difficult.

## *e-Learning Modules*

For e-learning modules, there are three questions that you should answer in evaluating options.

### How Will Modules Be Created?

In some situations, faculty may be the ones creating the modules on their own without the use of an instructional designer. In this case, you will want to have a tool that has a low barrier of entry in terms of costs and learning curve for using the tool. However, if your situation has faculty working closely with an instructional designer on developing the module, you can consider one of the more expensive e-learning development tools such as Adobe Captivate, Adobe Presenter, or Articulate Storyline. These rapid e-learning development tools have steep learning curves but your instructional designer should be experienced with at least one, if not all, of these tools. Their experience with the tools will likely be working with subject matter experts to organize and develop the content through these tools.

### How Will You Deliver the Content? How Will Students Access the Content?

You will want to consider how you will be sharing the content that is being developed as e-learning modules. The authors are currently leveraging Adobe Connect to both host their e-learning content as well as using Adobe Connect for webinars. Since there is unlimited storage as part of the contract for the webinar rooms, the storage for the e-learning modules is not an additional cost. Files created with Articulate Storyline can also be uploaded and shared using Adobe Connect, although it cannot be published directly from Storyline to the Connect server as you can with Captivate and Presenter files. Modules created with one of these tools can be exported as zip files which can then be uploaded to a web server or within an LMS, such as Blackboard, Moodle, or Sakai, or distributed and viewed locally on students' devices.

**Will You Be Using SCORM or Some Other Standard?** 399

SCORM is a standard that allows for the tracking of student progress and scores on 400
quizzes and is typically reported and managed through an LMS. If this is something 401
that your faculty are looking for, it is important to pick a tool that will allow for the 402
publishing of files in a format that will work within your LMS. Most commercially 403
available e-learning development tools (e.g., Captivate, Presenter, and Storyline) 404
can publish to SCORM, however, they may not be able to publish to other formats. 405
It will be important to make sure the LMS and software are able to communicate 406
correctly. 407

# Conclusion 408

Over the last decade, we have seen a shift from distance education being an excep- 409
tion to gradually becoming an accepted norm for instruction. Public perception has 410
changed to be more accepting of distance education. The previous perception was 411
that it was not possible to receive high-quality online education, but that perception 412
has waned over the years. Additionally, in the past, students shied away from dis- 413
tance education out of concerns about the quality of the instructional experience, but 414
we are also seeing these feelings shift. The authors have observed a significant 415
increase not only in demand from students for distance education offerings but also 416
in interest from faculty in providing more distance education offerings. These two 417
needs present a rich justification for developing a long-term infrastructure plan that 418
is able to meet the needs of the institution, faculty, and students as well as allow for 419
flexibility to evolve and adjust as technology changes. 420
  One of the limitations of this chapter is that it cannot possibly provide the answers 421
for all situations because each institution will have a specific enterprise infrastruc- 422
ture available. Additionally, each institution will have unique needs from the size of 423
the student population to the percentage of online course offerings or overall course 424
objectives. The challenge for e-learning leaders is fully understanding the underly- 425
ing concepts and needs for a technology infrastructure plan and then adapting and 426
applying it to their specific environment. This chapter aids in that process by provid- 427
ing background information about webinars, classroom captures, and e-learning 428
modules and some guiding questions to consider when evaluating each of these 429
tools. 430

# For More Information 431

- Gartner technology research: http://www.gartner.com/technology/home.jsp 432
- Duke University resources on video and web conferencing: https://oit.duke.edu/ 433
  voicevideoweb/phones/conferencing/index.php 434

435 • Purdue University transitioning to WebEx: http://www.itap.purdue.edu/news-
436     room/news/140811_webex_web_conferencing.html
437 • Indiana University Adobe Connect resources: https://kb.iu.edu/d/bfnl

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