United States Court of Appeals for the Federal Circuit

RICHARD A. WILLIAMSON, Trustee for At Home Bondholders Liquidating Trust,
Plaintiff-Appellant,

v.

CITRIX ONLINE, LLC, CITRIX SYSTEMS, INC., MICROSOFT CORPORATION, AND ADOBE SYSTEMS, INC.,
Defendants-Appellees,

AND

WEBEX COMMUNICATIONS, INC., CISCO WEBEX, LLC, AND CISCO SYSTEMS, INC.,
Defendants-Appellees,

AND

INTERNATIONAL BUSINESS MACHINES CORPORATION,
Defendant-Appellee.

2013-1130

Appeal from the United States District Court for the Central District of California in No. 11-CV-2409, Judge A. Howard Matz.

Decided: November 5, 2014

BRETT J. WILLIAMSON, O'Melveny & Myers LLP, of Newport Beach, California, argued for plaintiff-appellant. With him on the brief was TIMOTHY D. BYRON. Of counsel on the brief were WILLIAM NORVELL, JR., SCOTT D. MARRS and BRIAN THOMAS BAGLEY, Beirne, Maynard & Parsons, L.L.P., of Houston, Texas.

KURT L. GLITZENSTEIN, Fish & Richardson P.C., of Boston, Massachusetts, argued for all defendants-appellees. With him on the brief for defendants-appellees Citrix Online, LLC, et al. were FRANK E. SCHERKENBACH, of Boston, Massachusetts; and INDRANIL MUKERJI, of Washington, DC. Of counsel was Jonathan J. Lamverson, of Redwood City, California. On the brief for defendants-appellees Webex Communications, Inc., et al. were DOUGLAS M. KUBEHL, SAMARA L. KLINE and BRIAN D. JOHNSTON, Baker Botts LLP, of Dallas, Texas. On the brief for defendant-appellee International Business Machines Corporation were MARK J. ABATE and CALVIN E. WINGFIELD, JR., Goodwin Procter LLP, of New York, New York, GREGORY S. BISHOP, of Menlo Park, California, and WILLIAM F. SHEEHAN, of Washington, DC. Of counsel was ISABELLA E. FU, Microsoft Corporation, of Redmond, Washington, for defendant-appellee Microsoft Corporation.

Before MOORE, LINN, and REYNA, *Circuit Judges.*[1]

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[1] Randall R. Rader, who retired from the position of Circuit Judge on June 30, 2014, did not participate in this decision. Judge Moore was appointed to join the panel pursuant to Fed. Cir. R. 47.11.

Opinion for the court filed by *Circuit Judge* LINN.

Dissenting opinion filed by *Circuit Judge* REYNA.

LINN, *Circuit Judge*.

Richard A. Williamson ("Williamson"), as trustee for the At Home Corporation Bondholders' Liquidating Trust, owns U.S. Patent No. 6,155,840 ("the '840 patent") and appeals from the stipulated final judgment in favor of defendants Citrix Online, LLC; Citrix Systems, Inc.; Microsoft Corporation; Adobe Systems, Inc.; Webex Communications, Inc.; Cisco Webex, LLC; Cisco Systems, Inc.; and International Business Machines Corporation (collectively, "Appellees"). Because the district court erroneously construed the limitations "graphical display representative of a classroom" and "first graphical display comprising . . . a classroom region," we vacate the judgment of non-infringement of claims 1–7 and 17–24 of the '840 patent. Because the district court erroneously construed the limitation "distributed learning control module," as a means-plus-function expression, we vacate the judgment of invalidity of claims 8–12 of the '840 patent under 35 U.S.C. § 112, para. 2. Accordingly, we remand.

BACKGROUND

I. The '840 Patent

The '840 patent describes methods and systems for "distributed learning" that utilize industry standard computer hardware and software linked by a network to provide a classroom or auditorium-like metaphor—i.e., a "virtual classroom" environment. The objective is to connect one or more presenters with geographically remote audience members. '840 patent, col. 2 ll. 10–14. The disclosed inventions purport to provide "the benefits of classroom interaction without the detrimental effects of complicated hardware or software, or the costs and incon-

venience of convening in a separate place." *Id.* at col. 2 ll. 4–7.

There are three main components of the "distributed learning" system set forth in the '840 patent: (1) a presenter computer, (2) audience member computers, and (3) a distributed learning server. The distributed learning server implements a "virtual classroom" over a computer network, such as the Internet, to facilitate communication and interaction among the presenter and audience members. The presenter computer is used by the presenter to communicate with the audience members and control information that appears on the audience member's computer screen. *Id.* at col. 4 l. 66–col. 5 l. 2. An audience member's computer is used to display the presentation and can be used to communicate with the presenter and other audience members. *Id.* at col. 5 ll. 11–14.

The '840 patent has three independent claims. These claims recite the following:

> 1. A method of conducting distributed learning among a plurality of computer systems coupled to a network, the method comprising the steps of:
>
> providing instructions to a first computer system coupled to the network for:
>
> creating a *graphical display representative of a classroom*;
>
> creating a graphical display illustrating controls for selecting first and second data streams;
>
> creating a first window for displaying the first selected data stream; and
>
> creating a second window for displaying the second selected data stream, wherein

the first and second windows are displayed simultaneously; and

providing instructions to a second computer system coupled to the network for:

creating a *graphical display representative of the classroom*;

creating a third window for displaying the first selected data stream; and

creating a fourth window for displaying the second selected data stream, wherein

the third and fourth windows are displayed simultaneously.

8. A system for conducting distributed learning among a plurality of computer systems coupled to a network, the system comprising:

a presenter computer system of the plurality of computer systems coupled to the network and comprising:

a content selection control for defining at least one remote streaming data source and for selecting one of the remote streaming data sources for viewing; and

a presenter streaming data viewer for displaying data produced by the selected remote streaming data source;

an audience member computer system of the plurality of computer systems and coupled to the presenter computer system via the network, the audience member computer system comprising:

an audience member streaming data viewer for displaying the data produced by the selected remote streaming data source; and

a distributed learning server remote from the presenter and audience member computer systems of the plurality of computer systems and coupled to the presenter computer system and the audience member computer system via the network and comprising:

a streaming data module for providing the streaming data from the remote streaming data source selected with the content selection control to the presenter and audience member computer systems; and

a *distributed learning control module* for receiving communications transmitted between the presenter and the audience member computer systems and for relaying the communications to an intended receiving computer system and for coordinating the operation of the streaming data module.

17. A distributed learning server for controlling a presenter computer system and an audience member computer system coupled to the distributed learning server via a network, the distributed learning server comprising:

a module for providing a first graphical display on the presenter computer system, the *first graphical display comprising*:

a first presenter content selection control for selecting a first source of streaming content representative of graphical information;

a first presenter content display region for displaying the graphical information represented by the streaming content from the first selected source;

> a second presenter content selection control for selecting a second source of streaming content representative of graphical information; and
>
> a second presenter content display region for displaying the graphical information represented by the streaming content from the second selected source, wherein the first and second presenter content display regions are adapted to display simultaneously; and
>
> *a classroom region* for representing the audience member computer system coupled to the distributed learning server; and
>
> a module for providing a second graphical display on the audience member computer system, the second graphical display comprising:
>
> a first audience member content display region for displaying the graphical information represented by the streaming content from the first source selected by the content selection control; and
>
> a second audience member content display region for displaying the graphical information represented by the streaming content from the second source selected by the content selection control, wherein the first and second audience member content display regions are adapted to display simultaneously.

Id. at col. 10 ll. 28–52, col. 11 ll. 26–62, col. 12 ll. 29–65 (emphases added for relevant terms).

II. Procedural History

Williamson accused Appellees of infringing the '840 patent based on their alleged manufacture, sale, offer for sale, use, and importation of various systems and meth-

ods of online collaboration. On March 22, 2011, Williamson filed suit in the United States District Court for the Central District of California specifically asserting infringement of all 24 claims of the '840 patent. On September 4, 2012, the district court issued a claim construction order, construing, *inter alia*, the following limitations of independent claims 1 and 17: "graphical display representative of a classroom" and "first graphical display comprising . . . a classroom region" (collectively, the "graphical display" limitations). The district court held that these terms require "a pictorial map illustrating an at least partially virtual space in which participants can interact, and that identifies the presenter(s) and the audience member(s) by their locations on the map."

In its claim construction order, the district court also concluded that the limitation of claim 8, "distributed learning control module," was a means-plus-function term under 35 U.S.C. § 112, para. 6. The district court then evaluated the specification and concluded that it failed to disclose the necessary algorithms for performing all of the claimed functions. The district court thus held claim 8 and its dependent claims 9–16 invalid as indefinite under § 112, para. 2.

Williamson conceded that under the district court's claim constructions, none of Appellees' accused products infringed independent claims 1 and 17 and their respective dependent claims 2–7 and 18–24, and that claims 8–16 were invalid. The parties stipulated to final judgment. Williamson appeals the stipulated entry of judgment, challenging these claim construction rulings. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

DISCUSSION

I. Standard of Review

Claim construction is a legal issue that this court reviews de novo on appeal. *Lighting Ballast Control LLC v.*

Philips Elecs. N. Am. Corp., 744 F.3d 1272, 1276–77 (Fed. Cir. 2014) (en banc). To ascertain the scope and meaning of the asserted claims, this court looks to the words of the claims themselves, the specification, the prosecution history, and, lastly, any relevant extrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315–17 (Fed. Cir. 2005) (en banc). Whether claim language invokes § 112, para. 6,[2] is an exercise of claim construction and is therefore a question of law, subject to de novo review. *Personalized Media Commc'ns, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 702 (Fed. Cir. 1998).

II. The "graphical display" Limitations

Williamson asserts that the district court erred in its construction of the graphical display terms by improperly importing an extraneous "pictorial map" limitation into the claim. Williamson argues that requiring a "map" unduly narrows the claims to the preferred embodiment disclosed in the written description and that there is no support in the intrinsic record for confining the claims to a "pictorial map" that identifies the location of the participants. Williamson alleges that a proper definition must require the audience members to be able to interact with both the presenter and other audience members. He therefore asserts that the proper construction of the graphical display terms is "a viewable illustration of an at least partially virtual space that allows audience members to interact with both the presenter and other audience members."

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[2] Paragraph 6 of 35 U.S.C. § 112 was replaced with newly designated § 112(f) when § 4(c)(6) of the Leahy–Smith America Invents Act ("AIA"), Pub. L. No. 112–29, took effect on September 16, 2012. Because the patent application that led to the '840 patent was filed before the effective date of the AIA, we apply the pre-AIA version of that section.

Appellees respond that the district court's construction correctly limited the claims to a "pictorial map" consistent with the teachings of the written description. According to Appellees, this construction does not import a limitation from the preferred embodiment, but simply reflects the functional aspects of a "classroom" in a manner that is consistent with what the patentee invented and disclosed. Moreover, according to Appellees, it is consistent with the only depiction of a classroom shown in the '840 patent, which shows a pictorial map as a seating chart that identifies the presenters and audience members by their locations on the map.

We agree with Williamson. The district court erred in construing these terms as requiring a "pictorial map." First, the claim language itself contains no such "pictorial map" limitation. "[I]t is the *claims*, not the written description, which define the scope of the patent right." *Laitram Corp. v. NEC Corp.*, 163 F.3d 1342, 1347 (Fed. Cir. 1998); *see id.* ("[A] court may not import limitations from the written description into the claims."). While the specification discloses examples and embodiments where the virtual classroom is depicted as a "map" or "seating chart," nowhere does the specification limit the graphical display to those examples and embodiments. This court has repeatedly "cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification." *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1327–28 (Fed. Cir. 2002) (quoting cases).

Here, there is no suggestion in the intrinsic record that the applicant intended the claims to have the limited scope determined by the district court. To the contrary, the embodiments and examples in the specification of classroom metaphors relating to "maps" are consistently described in terms of preference. For example, at column 2, lines 34–39, the specification states that "[t]he classroom metaphor *preferably* provides a map of the classroom showing the relative relationships among the

presenters and audience members." '840 patent, col. 2 ll. 37–39 (emphasis added). In another example, the graphical display of Figure 6 is described as an "exemplary display" on the presenter's computer. *Id.* at col. 7 ll. 35–36. That exemplary display includes a window that "*preferably* provides a seating chart showing the audience members and presenters in the classroom or auditorium." *Id.* at col. 9 ll. 5–7 (emphasis added).

The '840 patent defines a classroom as "an at least partially virtual space in which participants can interact." *Id.* at col. 6 ll. 5–7. Nothing further is required, and no greater definition is mandated by the language of the claims, the specification, or the prosecution history. As is well settled, the claims must "not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Innova/Pure Water, Inc., v. Safari Water Filtration Sys. Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004) (internal quotations omitted).

For the foregoing reasons, we conclude that the district court incorrectly construed the graphical display terms to have a "pictorial map" limitation. We therefore vacate the stipulated judgment of non-infringement of claims 1–7 and 17–24. The "graphical display" limitations in claims 1 and 17 are properly construed as "a graphical representation of an at least partially virtual space in which participants can interact."

III. The "distributed learning control module" Limitation

On appeal, Williamson argues that the district court erred in construing the term "distributed learning control module" as being governed by 35 U.S.C. § 112, para. 6. Williamson contends that the district court failed to give appropriate weight to the "strong" presumption against means-plus-function claiming that attaches to claim terms that do not recite the word "means." Williamson

also argues that the district court wrongly focused its analysis on the word "module" instead of the full term, ignored the detailed support provided in the written description, and misapplied our law by failing to view the term from the perspective of one of ordinary skill in the art.

Appellees respond that the district court correctly concluded that the presumption against means-plus-function claiming was rebutted because "distributed learning control module" does not have a well understood structural meaning in the computer technology field. Appellees argue that the "distributed learning control module" limitation is drafted in the same format as a traditional means-plus-function limitation, and merely replaces the term "means" with the "nonce" word "module," thereby connoting a generic "black box" for performing the recited computer-implemented functions. In Appellees' view, since the term should be treated as a means-plus-function claim term and there is no algorithmic structure for implementing the claimed functions in the written description, the finding of indefiniteness should be affirmed.

We agree with Williamson that the district court erred in concluding that "distributed learning control module" is a means-plus-function claim term.

Section 112, para. 6, provides that "[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof." 35 U.S.C. § 112, para. 6 (1994). In *Personalized Media Commc'ns, LLC v. International Trade Commission*, 161 F.3d 696 (Fed. Cir. 1998), and again in *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005 (Fed. Cir. 2006), we stated that the failure to use the word "means" in a claim limitation created a rebuttable presumption that 35 U.S.C. § 112, para. 6 did not apply. *See Personalized Media*, 161 F.3d at 703–04; *DePuy Spine*,

469 F.3d at 1023. This presumption is "a strong one that is not readily overcome." *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004). To rebut this strong presumption, it must be demonstrated that "skilled artisans, after reading the patent, would conclude that [the] claim limitation is so devoid of structure that the drafter constructively engaged in means-plus-function claiming." *Inventio AG v. ThyssenKrupp Elevator Ams. Corp.*, 649 F.3d 1350, 1357 (Fed. Cir. 2011). A claimed expression cannot be said to be devoid of structure if it is used "in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function." *Lighting World*, 382 F.3d at 1359–60.

"Technical dictionaries, which are evidence of the understandings of persons of skill in the technical arts" may inform whether claim terms connote structure. *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004); *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1355 (Fed. Cir. 2006). Moreover, in circumstances in which "[a] structure-connoting term . . . is coupled with a description of [its] operation, sufficient structural meaning generally will be conveyed to persons of ordinary skill in the art." *Linear Tech*, 379 F.3d at 1320. In making this assessment, it is important to consider the claimed expression as a whole, and not merely any single word, as well as its surrounding textual context. *See Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1372 (Fed. Cir. 2003) ("[T]he primary source of this error lies in the district court's reliance on single words of the limitations . . . as opposed to the limitations as a whole . . . ."); *Mass. Inst. of Tech.*, 462 F.3d at 1356 ("The claim language here too does not merely describe a circuit; it adds further structure by describing the operation of the circuit.").

The district court here failed to give weight to the strong presumption that 35 U.S.C. § 112, para. 6, did not apply based on the absence of the word "means." "[W]e have seldom held that a limitation not using the term 'means' must be considered to be in means-plus-function form," and "the circumstances must be [unusual] to overcome the presumption." *Lighting World*, 382 F.3d at 1362.

Moreover, in determining that the strong presumption was overcome, the district court erred: (1) in failing to appreciate that the word "module" has a number of dictionary meanings with structural connotations; (2) in placing undue emphasis on the word "module" separate and apart from the claimed expression "distributed learning control module"; and (3) in failing to give proper weight to the surrounding context of the rest of the claim language and the supporting text of the specification in reaching the conclusion that the drafter employed means-plus-function claiming.

The district court, in characterizing the word "module" as a mere nonce word, failed to appreciate that the word "module" has understood dictionary meanings as connoting either hardware or software structure to those skilled in the computer arts. While the parties here have not cited any dictionaries, we have frequently looked to the dictionary to determine if a disputed term has achieved recognition as a term denoting structure. "[J]udges are free to consult dictionaries and technical treatises 'at any time in order to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.'" *Phillips*, 415 F.3d at 1322–23 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 n.6 (Fed. Cir. 1996)); *see also Lighting World*, 382 F.3d at 1360; *Mass. Inst. of Tech.*, 462 F.3d at 1355. The IBM Corporation, *IBM Dictionary of Computing* 439 (1st ed. 1994)

defines "module" as a "packaged functional hardware unit designed for use with other components" and a "part of a program that usually performs a particular function of related functions." *See also* Alan Freedman, *The Computer Glossary* 268 (8th ed. 1998) (defining "module" as a "self-contained hardware or software component that interfaces with a larger system"); John Daintith & Edmund Wright, *Dictionary of Computing* 315 (4th ed. 1996) (defining "module" as a "programming or specification construct that defines a software component" and a "component of a hardware system that can be subdivided"). These definitions all show that the term "module" has a structure connoting meaning to persons of ordinary skill in the computer arts.

Appellees cite an unpublished opinion in *Ranpak Corp. v. Storopack, Inc.*, No. 98-1009, *available at* 1998 WL 513598 (Fed. Cir. July 15, 1998), to support their conclusion that "module" means nothing more than "means." That case, however, dealt with reconciling two claimed expressions that differed only in those words. The court made no reference to any dictionary meanings of the word "module" and made no analysis or ruling as to the meaning of the word "module" beyond the limited context of the issue confronting it in that case.

Not only did the district court fail to appreciate the structure-connoting meanings of the word "module" reflected in dictionaries, it also failed to consider the claimed expression "distributed learning control module" as a whole. This was error. *See Apex*, 325 F.3d at 1372. The adjectival modifiers "distributed learning control" cannot be ignored and serve to further narrow the scope of the expression as a whole. *Id.* at 1374. Here, the "distributed learning control module" is claimed as a part of the definite structure "distributed learning server" and "receive[s] communications transmitted between the presenter and the audience member computer systems," "relay[s] the communications to an intended receiving

computing system," and "coordinat[es] the operation of the streaming data module." '840 patent, col. 11 ll. 55–62. These claimed interconnections and intercommunications support the conclusion that one of ordinary skill in the art would understand the expression "distributed learning control module" to connote structure.

The specification further explains that the distributed learning control module operates as a functional unit of the distributed learning server and coordinates the operation of the streaming data module through input from the presenter computer system. *Id.* at col. 5 ll. 34–36. The specification also makes clear that the distributed learning control module includes software that runs on a portion of the distributed learning server. *Id.* at col. 5 ll. 40–58. While the supporting specification describes the claimed expression "distributed learning control module" in a high degree of generality, in some respects using functional expressions, it is difficult to conclude that it is devoid of structure. *See Lighting World*, 382 F.3d at 1359–60 (A claimed expression cannot be said to be devoid of structure if it is used "in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function.")

For these reasons, we determine that the Appellees have failed to overcome the strong presumption that the expression "distributed learning control module" is not subject to 35 U.S.C. § 112, para. 6. We therefore vacate the district court's determination that claims 8–12 are invalid under 35 U.S.C. § 112, para. 2, based on that construction.

CONCLUSION

Because the district court erred in construing the "graphical display" limitations of claims 1 and 17 and the "distributed learning control module" limitation of claim

8, we vacate the stipulated judgment of non-infringement of claims 1–7 and 17–24 and of invalidity of claims 8–16 and remand the case to the district court.

VACATED AND REMANDED

COSTS

Costs to Williamson.

United States Court of Appeals for the Federal Circuit

RICHARD A. WILLIAMSON, Trustee for At Home Bondholders Liquidating Trust,
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Defendant-Appellee.

2013-1130

Appeal from the United States District Court for the Central District of California in No. 11-CV-2409, Judge A. Howard Matz.

REYNA, *Circuit Judge*, dissenting.

I agree with the majority that the district court erred in finding that the "graphical display representative of a classroom" terms require a pictorial map. The majority, however, ignores critical evidence showing that an image of a visually depicted virtual classroom is required. Further, I do not agree that claim 8 of the '840 patent discloses sufficient structure to keep the claim limitation "distributed learning control module" outside of the requirements of 35 U.S.C. § 112, paragraph 6. For these and the reasons set forth below, I respectfully *dissent*.

I

The majority reverses the district court's conclusion that the "graphical display representative of a classroom" terms require a pictorial map and construes the terms as "a graphical representation of an at least partially virtual space in which participants can interact." While the majority is correct that the claims of the '840 patent do not require a pictorial map, the majority has adopted a construction that ignores a critical limitation. As reviewed below, the specification and prosecution history make clear that the "graphical display representative of a classroom" terms are properly construed as requiring a visually depicted virtual classroom.

During patent prosecution, the applicant explained that the invention is distinct from the prior art because the patent requires a "visual virtual classroom" displayed on both a first and second computer system:

> Additionally, [the prior art] does not disclose the claimed feature of "creating a graphical display representative of the classroom" on a second computer system coupled to the network. The present invention allows both a first computer system (for example, the presenter computer system) and a second computer system (for example, an audience

> member) to view a graphical display of the classroom. This claimed feature of the present invention allows the audience members to interact *in a visual virtual classroom environment* with both the presenter and other audience members.
>
> By contrast, [the prior art] merely discloses "[as] the students log in, their seating locations in the classroom are shown by a highlighted icon in the classroom map on the teacher's screen." . . . *[The prior art] does not teach or suggest displaying a graphical display representative of a classroom on a student's screen.*

J.A. 1267-68 (original emphasis removed and emphases added). These statements in conjunction with the patent's claim terms confirm the significance of displaying a visually depicted virtual classroom.

The "classroom metaphor" is used extensively in characterizing the operation, and touting the benefits, of the inventions embodied in the '840 patent. The Abstract teaches that "[t]he classroom environment module provides a classroom metaphor having a podium and rows of seats to the presenter and audience computer systems." '840 patent Abstract. The Summary of the Invention states that the drawbacks of the prior art are overcome "by a distributed learning system that uses industry-standard computer hardware and software linked by a network like the Internet to provide a classroom- or auditorium-like metaphor to at least one presenter and at least one audience member." *Id.* col. 2 ll. 10-14. The patent further teaches that a "feedback region" on the presenter's computer "preferably displays a graphical representation of the classroom" and the "classroom environment module" is used to provide "a classroom- or auditorium-like metaphor to the presenter and audience members." *Id.* col. 3 ll. 11-13, col. 5 l. 67-col. 6 l. 1.

In this case, the repeated mention of the classroom metaphor within the context of the invention and the importance of a visually depicted virtual classroom in the prosecution history indicate that the "graphical display representative of a classroom" terms require a visually depicted virtual classroom. The construction derived by the majority reads out this important limitation that distinguishes the invention from the prior art. *See Callicrate v. Wadsworth Mfg., Inc.*, 427 F.3d 1361, 1369 (Fed. Cir. 2005) (holding that it was error for the district court to read out a limitation clearly required by the claim language and specification). It is error to read a claim too broadly, as it is to read a claim too narrowly. *See, e.g., Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005) (en banc). In reading out this important limitation on the "graphical display representative of a classroom" terms, the majority sidesteps our well established rules of claim construction, causing them to reach an erroneous result.

II

The majority also concludes that the district court erred in construing the term "distributed learning control module" as a means-plus-function term. The majority holds that the term "distributed learning control module" connotes sufficient structure to keep the term outside the scope of 35 U.S.C. § 112, paragraph 6. Maj. Op. at 16. The majority, however, finds structure where none exists.

Here, "distributed learning control module" does not connote sufficiently definite structure, and thus, the term is governed by § 112, paragraph 6. In place of using the term "means," this claim limitation uses "module." The claim limitation then recites three functions performed by the "distributed learning control module":

> [D]istributed learning control module for [(1)] receiving communications transmitted between the presenter and the audience member computer

> systems and [(2)] for relaying the communications to an intended receiving computer system and [(3)] for coordinating the operation of the streaming data module."

'840 patent col. 11 ll. 56-61. This claim limitation is in the traditional means-plus-function format, with the minor substitution of the term "module" for "means." The claim language explains what the functions are, but does not disclose how the functions are performed.[1] In this case, the term "module" is a "nonce" word, a generic word inherently devoid of structure.

"Module" is a "nonce" word that can operate as a substitute for "means" in the context of § 112, paragraph 6. As the district court found, "'module' is simply a generic description for software or hardware that performs a specified function."[2] J.A. 31. Generic terms such as "mechanism," "element," "device," and other "nonce" words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word "means" because they "typically do not connote sufficiently definite structure" and therefore may invoke § 112, paragraph 6. *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006); *see generally* M.P.E.P. § 2181 ("The following is a list of nonstructural generic placeholders that may invoke . . . 35 U.S.C. [§] 112, paragraph 6: 'mechanism for,' '*module for*,' 'device for,' 'unit for,' 'component for,' 'ele-

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[1] As we have often held, structure may also be provided by describing the claim limitation's operation, such as its input, output, or connections. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014).

[2] Williamson concedes this point. Appellant's Op. Br. at 43 ("[T]he term 'module,' standing alone, is capable of operating as a 'nonce word.'").

ment for,' 'member for,' 'apparatus for,' 'machine for,' or 'system for.'") (emphasis added).

Recognizing that the term "module" is a mere placeholder word with no definition in the specification, the majority resorts to extrinsic evidence in the form of the following dictionary definitions of the term "module":

- The IBM Corporation, *IBM Dictionary of Computing* 439 (1st ed. 1994) - a packaged functional hardware unit designed for use with other components and a part of a program that usually performs a particular function of related functions.
- Alan Freedman, *The Computer Glossary* 268 (8th ed. 1998) - a self-contained hardware or software component that interfaces with a larger system.
- John Daintith & Edmund Wright, *Dictionary of Computing* 315 (4th ed. 1996) - programming or specification construct that defines a software component and a component of a hardware system that can be subdivided.

Maj. Op. at 14-15. The majority concludes that "[t]hese definitions all show that the term 'module' has a structure connoting meaning to persons of ordinary skill in the computer arts." *Id.* at 15.

The definitions, however, only identify that "module" is either hardware, software, or both. Without more, the concept of generic software or hardware only reflects function. It refers only to a "general category of whatever may perform specified functions." *Robert Bosch, LLC v. Snap-On Inc.*, --- F.3d ---, No. 2014-1040, 2014 WL 5137569, at *4 (Fed. Cir. Oct. 14, 2014) (holding that the claim terms "program recognition device" and "program loading device" are governed by 35 U.S.C. § 112, paragraph 6 because they fail to connote sufficient structure).

Consider that the *IBM Dictionary of Computing* uses the terms "functional hardware unit" and "[something] that performs a particular function." Maj. Op. at 14-15. *The Computer Glossary* similarly defines "module" in terms of its function: "interfac[ing]." *Id.* at 15. Finally, the *Dictionary of Computing* defines "module" as a "construct" or "component." *Id.* The definitions disclose what software or hardware potentially do, not how it is done.

Numerous other dictionary definitions from the relevant time period also define the "module" in functional terms. For example, the *Webster's New World Dictionary of Computer Terms* 331 (6th ed. 1997) defines "module" as "[i]n a program, a unit or section that can function on its own." The *IEEE Standard Dictionary of Electrical and Electronics Terms* 817 (5th ed. 1993) defines "module" as "a logically separable part of a program" and goes on to note that "[t]he terms 'module,' 'component,' and 'unit' are often used interchangeably."[3] The *American Heritage College Dictionary* 877 (3d ed. 1997) defines "module" as "[a] portion of a program that carries out a specific function and may be used alone or combined with other modules of the same program." These definitions, again, generally define "module" as generic software or hardware that performs a certain function.

The majority also undertakes a grammatical approach noting that the "adjectival modifiers . . . cannot be ignored and serve to further narrow the scope of the expression as a whole." Maj. Op. at 15. The majority points to the terms "distributed," "learning," and "control" as modifiers

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[3] *Cf.* M.P.E.P. § 2181 ("The following is a list of nonstructural generic placeholders that may invoke . . . 35 U.S.C. [§] 112, paragraph 6: 'mechanism for,' 'module for,' 'device for,' '*unit for*,' '*component for*,' 'element for,' 'member for,' 'apparatus for,' 'machine for,' or 'system for.'") (emphases added).

that connote structure. *Id.* at 15. While the majority is correct that the presence of modifiers can change the meaning of a claimed nonce word, the modifiers relied on by the majority do not provide any structural significance to the term "module." The ordinary meanings of these terms do not connote structure, and neither the specification nor the prosecution history gives these adjectives any structural significance in this claim.

Finally, the majority concedes that the "distributed learning control module" operates as a functional unit that is "described in a high degree of generality" in the specification using "functional expressions." *Id.* at 16. In my view, a "functional unit" claimed at a "high degree of generality" is pure functional claiming. The term "distributed learning control module" fails to connote any structure, the presumption against the application of means-plus-function claiming is rebutted, and, therefore, § 112, paragraph 6 applies.

III

Although the majority does not reach the issue of corresponding structure, I believe this analysis is necessary because the claim limitation at issue fails to disclose sufficient structure to keep "distributed learning control module" outside of the requirements of § 112, paragraph 6. Thus, I turn to the issue of whether the specification discloses sufficient structure that corresponds to the claimed function. I conclude that it does not.

The district court identified three claimed functions associated with the "distributed learning control module" term: (1) receiving communications transmitted between the presenter and the audience member computer systems; (2) relaying the communications to an intended receiving computer system; and (3) coordinating the operation of the streaming data module. The district court concluded that the specification fails to disclose structure corresponding to the "coordinating" function.

On appeal, it is undisputed that the claimed "coordinating" function is associated with the "distributed learning control module." Where there are multiple claimed functions, as we have here, the patentee must disclose adequate corresponding structure to perform all of the claimed functions. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1318-19 (Fed. Cir. 2012).

The district court was correct that the specification of the '840 patent fails to disclose corresponding structure because the specification does not set forth an algorithm for performing the claimed functions. *See Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008). Thus, I would affirm the judgment that claims 8-16 are invalid for indefiniteness under 35 U.S.C. § 112, paragraph 2.

For the foregoing reasons, I *dissent*.