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Visual Narratives of Change: Examining Students' Drawings and Teaching Transformations at MIT

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Abstract: Since its inception, the Massachusetts Institute of Technology (MIT, Cambridge, MA, USA) has preserved student drawings and design projects as educational tools and reference materials. This practice, modeled after the Fine Arts School tradition, led to the archiving of thousands of student thesis drawings during MIT's first century. These drawings provide valuable data for documenting the development of architectural education at MIT, illustrating shifts in representation techniques, responses to various influences, and changing architectural conceptualizations. In this study, we examine a collection of thesis drawings produced between 1873 and 1968 using a systematic, data-driven approach that incorporates both qualitative and quantitative methods for collection, processing, and analysis. By comparing these drawings with course catalogs from the corresponding years, we aim to investigate the relationship between drawing practices and teaching methodologies, contributing to a better understanding of the evolution of architectural education at MIT and the role of drawing in that process.

Keywords: archival analysis; architectural education; design teaching; digital mapping; freehand drawing and sketching; historical analysis; pedagogical strategies

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1. Introduction

What insights can student drawings provide about the history of an architecture school? At the Massachusetts Institute of Technology (MIT), student drawings and design projects have been preserved as both instructional tools and references for future generations of students. This practice, adapted from the model of the École des Beaux-Arts, led to MIT archiving several thousand student thesis drawings during its first century. Serving as invaluable educational resources, these drawings not only document the evolution of architectural education at MIT but also showcase diverse forms of representation, responses to internal and external influences, evolving conceptualizations of architecture, and the enduring definition of the school's identity over time.

The Department of Architecture at MIT is recognized as the oldest architecture program in the United States, having been founded in 1865 by William Robert Ware [1]. In shaping this program, Ware undertook an extensive study of European architectural schools, visiting various academic institutions in France, England, and Germany [2]. Ware's curriculum for the architecture program at MIT was science-based and divided into two areas: one focusing on construction and the other on composition and design. He identified architecture as a branch of the Fine Arts and aimed to balance scientific rigor with artistic expression [3]. Consequently, he emphasized the importance of drawing and manual skills

as essential components of architectural education, requiring students to have rigorous training in both technical and freehand drawing.

Ware gathered an extensive collection of drawings, prints, photographs, models, and casts, which were deposited in the Museum of Fine Arts in Boston, allowing students free access to these visual resources. Ware also placed great emphasis on students' work, collecting and archiving the best examples of drawings and design projects, which were hung on the studio walls until they were replaced by the work of subsequent years' students. This practice of collecting student work continued for nearly a hundred years until the late 1960s, when individual property and creative rights issues were raised. Despite attempts by students to revise this policy, it ultimately failed. However, as referred by Kimberly [4], the materials collected during this time remain a valuable source for mapping the department's evolution, illustrating both what was intended for MIT students to learn and the changing architectural trends that arrived at the school, such as the advent of modernism.

In this paper, we will examine a set of thesis drawings produced by former students of MIT between 1873 and 1968. This is a systematic and data-oriented approach, combining qualitative and quantitative research methods in the procedures of collection, processing, and analysis. We will compare these thesis drawings with the course catalogs of the corresponding years to understand the relationship between representation and teaching approach and the different roles that drawing has assumed over time.

2. Background

This study builds on insights from several significant prior studies, particularly in approach strategies, research methodologies, theoretical frameworks, and bibliographical references. The first is Kimberly's article [4], which, like our study, aims to provide a brief history of MIT's Architecture Department through the drawings produced by its students. While the article is concise and does not delve deeply into analyzing the drawings, it served as a crucial starting point for our work. It contextualized the collection of student thesis drawings within MIT's history and underscored the potential insights that a detailed analysis could offer.

Another important precedent is Schmid's doctoral research [5], which involved collecting and cataloging a set of notebooks used by drawing instructors at the Technical University of Munich over the past 150 years. The study traced the history of drawing instruction at the Munich School through these drawings and annotations, linking historical practices to contemporary teaching methods. It also provided theoretical foundations for current teaching approaches, situating them within a broader German and European context.

Chiavoni's article [6] serves as a valuable reference, focusing on student drawings produced between the 1930s and 1980s at the Department of Architectural History, Drawing, and Restoration at Sapienza Università di Roma. It highlights the role of drawing in the school's educational framework, particularly in surveying campaigns, and examines the creation of a digital archive, addressing challenges and illustrating the digitization process and database organization. Chiavoni has also extensively researched hand drawing and surveying [7–9].

Finally, a research project by a group of scholars from the Budapest University of Technology and Economics [10,11], which focused on a collection of historical drawings stored at the school since the 1860s, was also a key precedent. It analyzed thousands of drawings, including student projects, building surveys, and instructors' designs, to explore the role of drawing in architectural education. Previously unprocessed and inaccessible, this collection provided valuable insights into procedural and methodological aspects of research and offered a framework for organizing and contextualizing our study.

3. Materials and Methods

This study primarily relied on the MIT Museum, where the student thesis drawings are archived, and the MIT Libraries Dome, which stores the course catalogs. The period analyzed spans from 1873 to 1968, defined by the first and last entries in the Student Thesis Drawings Collection. The collection includes 7293 entries with associated metadata. These metadata serve as a valuable source of complementary insights, such as the increasing number of architecture graduates and the growing student-to-drawing ratio over time (Figure 1).

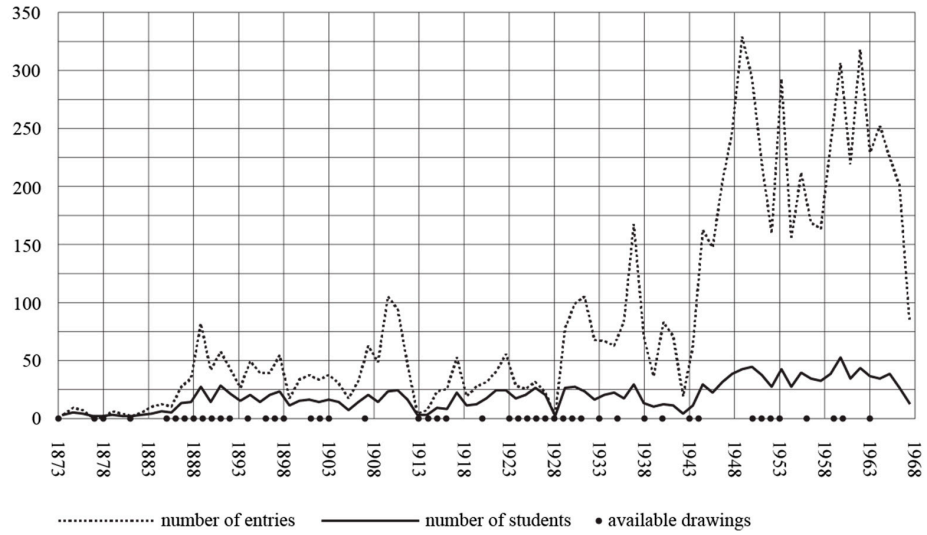


Figure 1. Relationship between the number of thesis drawings entries in the archive, the number of students, and the available materials. Authors' figure.

Despite the size of the collection, only a small portion has been digitized, totaling 413 entries unevenly distributed over the years [12]. After an initial overview, it was necessary to narrow the sample for a more detailed analysis. A criterion was established to select up to five drawings per year, prioritizing works from different students. This resulted in a final sample of 145 thesis drawings, which were examined for panel organization and content, modes of representation, architectural language, and functional programs.

In parallel, course catalogs published annually during the study period were reviewed. These catalogs, archived at the MIT Libraries Dome, outline the institution's general policies, available courses, curricula, and subject plans. Due to the length of these documents, ranging from 60 to 300 pages, one catalog was analyzed every five years, yielding a total of nineteen catalogs. The analysis focused on course descriptions, curriculum structure, and details of drawing and representation subjects.

The aim was to systematically analyze these archival materials and correlate them with MIT's historical timeline through a data-driven approach. A mixed-methods framework [13] was adopted, combining qualitative analysis of the drawings and catalogs with quantitative data.

The workflow was divided into three phases. The first phase involved systematically collecting, organizing, and processing archival materials and metadata to establish a dataset. The second phase was iterative, testing and refining analytical methods. Challenges in simultaneously analyzing the visual evidence of the drawings alongside the course catalogs led to the development of a visualization tool, referred to as a visual timeline (Figure 2).

The visual timeline allowed for the identification of trends in the chronology of the thesis drawings, verifying the consistency of panel compositions, representation modalities, and architectural languages (Figure 3). Based on this analysis, four periods were defined: the first from 1873 to 1885, the second from 1885 to 1924, the third from 1924 to 1933, and the fourth from 1933 to 1968, through which the results were organized [12].

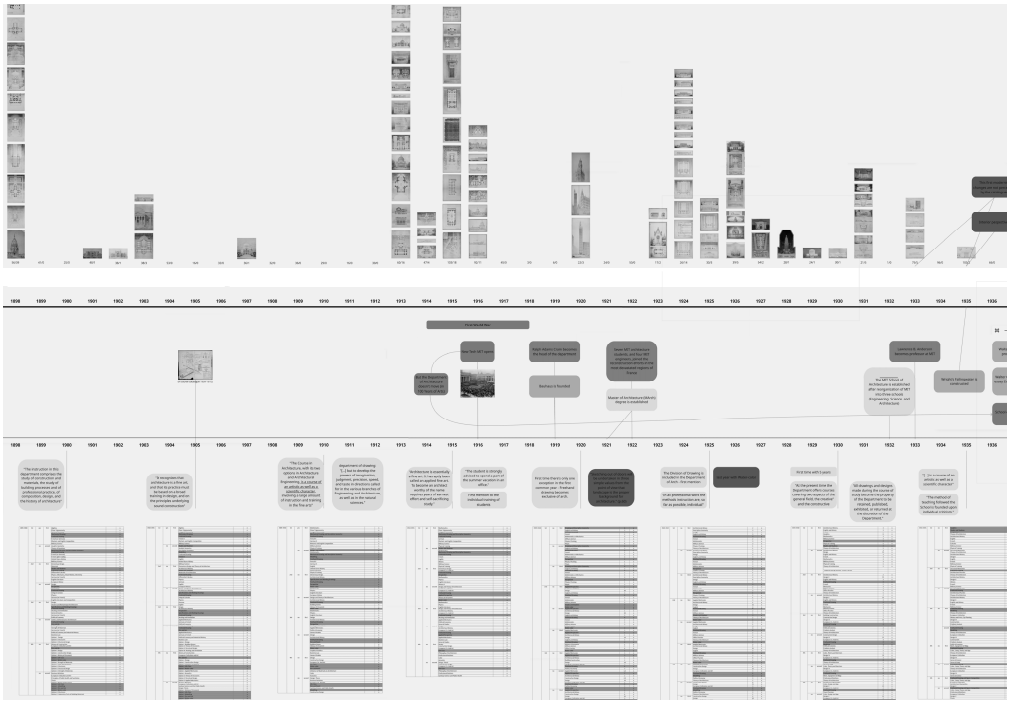


Figure 2. Detail of the visual timeline. The top band displays the thesis drawings selected for analysis, the middle band highlights significant historical events related to the school and others referenced in the literature, and the bottom band presents course catalogs synthesized into curricular programs, with courses related to representation emphasized. Authors' figure.

id	available	period	program	single	element	n element	captions	rendering	filled back	background	construction	line
1	n	first										
2	y	first	infrastructure	n	elevation, section, plan	4	y	real	n	real	n	hard
3	n	first										
4	n	first										
5	y	first	administration	n	elevation,	3	y	real	y	abstract	n	hard
6	y	first	administration	n	elevation, section, plan,	5	y	real	y	real	n	hard
7	y	first	support	n	elevation, plan, detail	5	y	real	y	abstract	n	hard
8	n	first										
9	n	first										
10	n	first										
11	y	first	administration	y	perspective	1	n	real	y	real	n	hard
12	n	first										
13	y	first	cultural	n	elevation, section,	6	y	real	y	abstract	n	hard
14	n	first										
15	y	first	cultural	n	elevation, plan, detail	4	y	real	y	abstract	n	hard
16	n	first										
17	y	first	finance	n	elevation, section, plan, detail	9	y	real	y	abstract	y	hard
18	n	first										
19	y	second	cultural	y	elevation	1	y	real	y	abstract	n	hard
20	y	second	cultural	y	section	1	n	n	y	n	n	hard
21	y	second	cultural	y	plan	1	y	n	y	n	n	hard
22	n	second										

Figure 3. Detail of the dataset with analysis categories. Each entry in the archive was assigned an ID, regardless of whether the material was available. After cataloging the entry by period, the following aspects were recorded: functional program, whether it is a panel with single or multiple elements, the presence of captions, the type of rendering, whether the background is filled, the type of background, whether constructive factors are considered, and finally, the type of line—hard or freehand. Authors' figure.

In the final phase, the focus shifted to interpreting the results. This involved conducting a narrative literature review on the institution's history, with particular attention to the

Architecture course program. This step was especially relevant, as it provided a foundation for the collected and analyzed data, allowing for their contextualization within the history of MIT and the teaching of architecture in the United States.

4. Results

4.1. Thesis Drawings from First Period, 1873–1885

The first period of architectural drawings had limited archival material but was distinct from later periods due to the slower evolution of its architectural language, panel composition, and representation style (Figure 4). A total of eight drawings were analyzed. The panels provided significant design information, featuring an average of four elements per panel. Elevations and plans were the most frequent (n = 7 each), followed by sections (n = 4), architectural and construction details (n = 3), and perspectives (n = 2).

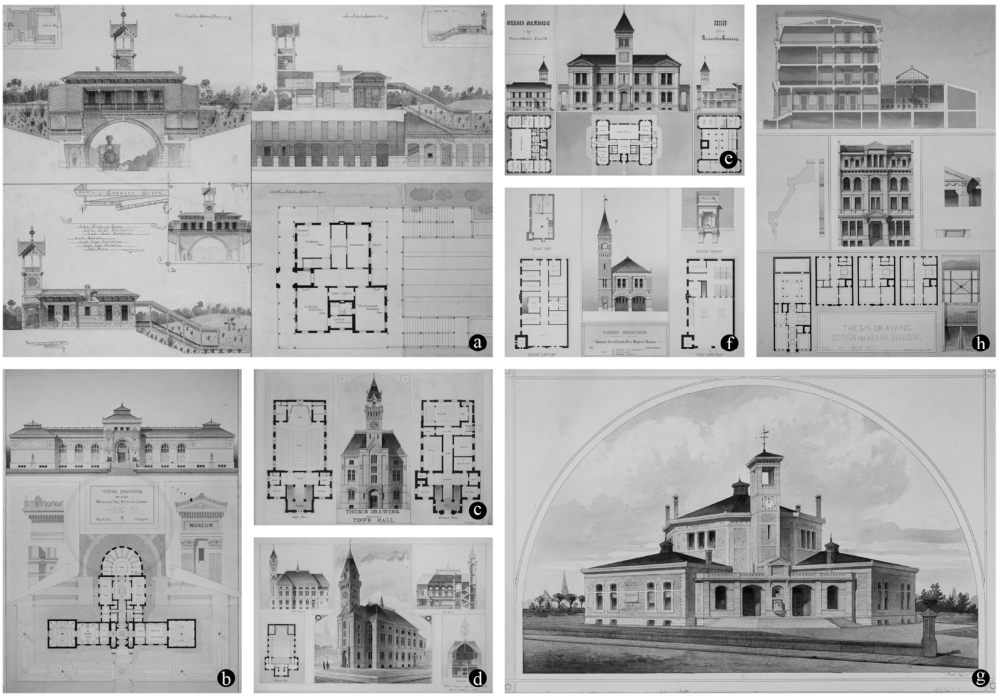


Figure 4. Selection of drawings by students from the first period, 1873 to 1885. (**a**) Country Depot by William Dowse; (**b**) Museum of Fine Arts and Library by Alfred Higgins; (**c**,**d**) Town Hall by George Capen; (**e**) Scientific Academy by Charles Eaton; (**f**) Fire Engine House by William Chamberlin; (**g**) Town Hall by Charles Baker; (**h**) Bank Building by Charles Wilkes. Courtesy of MIT Museum.

In terms of representation, elevations, sections, details, and perspectives were rendered, but plans were not. The renderings were realistic, with abstract scenarios (n = 5) being more common than real scenarios (n = 3). All drawings featured hard lines and were complemented by watercolors to depict color, light, and shadow. While construction details were included, most drawings prioritized the presentation of the project rather than construction specifics. Architecturally, this period was characterized by Revivalism, Neo-Renaissance, and Neoclassical styles, which continued into the second period.

4.2. Courses Catalogs from First Period, 1873–1885

During this time, the curriculum required an average of seventy-two courses, with fifteen focused on representation, including Freehand Drawing, Shades and Shadows, Mechanical Drawing, Perspective, and Blackboard Drawing. These representation courses constituted about 20% of the curriculum.

The curriculum spanned four years and eight semesters, with the first two semesters being common across all subjects. Students were required to take two key representation courses, Mechanical Drawing and Elements of Descriptive Geometry and Perspective, alongside Freehand Drawing. By 1869–1870, the Architectural Museum had assembled a significant collection of photographs, prints, drawings, and casts, underscoring the importance of representation in architectural education.

4.3. Thesis Drawings from Second Period, 1885–1924

This period was characterized by consistency in panels, representation, and architectural language, displaying significant homogeneity and longevity. A total of 73 drawings were analyzed. Panels became less informative, focusing more on panel composition and the quality of representation (Figure 5). Single-element panels (n = 53) predominated over multiple-element panels (n = 20), with captions becoming less common.

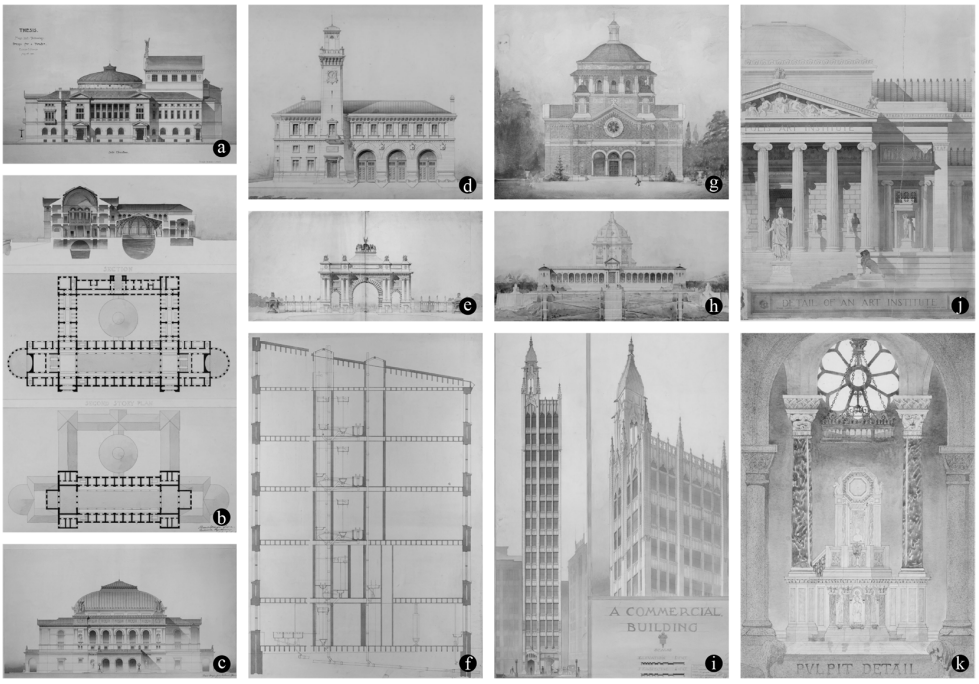


Figure 5. Selection of drawings by students from the second period, 1885 to 1924. (**a**) Theater by Eleazar Homer; (**b**) Marine Aquarium by Richard Hooker; (**c**) National Opera House by William Lawrence; (**d**) Police and Fire Station by Lewis Cannon; (**e**) Monumental Entrance to River Tunnel by Herbert Beers; (**f**) Plumbing System for a City House by Charles Alden; (**g**) College Chapel by Henry Glidden; (**h**) Mortuary Chapel by Edwin Dodge; (**i**) Commercial Building by Charles Wilson; (**j**) Art Institute by Jessie Gibson; (**k**) Chapel for a Tuberculosis Sanitarium by Charlotte Phelps. Courtesy of MIT Museum.

Plans (n = 24) and elevations (n = 23) continued to predominate, while the perspective elevation (n = 17) emerged as a new element (Figure 5c–e,g,h). Sections (n = 21) followed, with perspectives (n = 2) and details (n = 1) practically disappearing. An interior perspective appeared for the first time (Figure 5k). Representations focused on rendering all elements, including plans, with realistic renderings dominating.

Architectural styles of this period leaned toward Revivalist trends, including Neogothic, Neo-Renaissance, Neoclassical, and some eclectic architecture. Cultural facilities (n = 16) were the most common program, followed by religious facilities (n = 10) and private housing (n = 9). Most cultural and educational buildings, along with housing, were concentrated between 1885 and 1910.

The constructive dimension was almost nonexistent, with only one example of a technical–constructive drawing (Figure 5f). Watercolors complemented hard lines in representation,

particularly in depicting natural scenarios. Panel compositions became more centered and symmetrical, often resembling paintings and typically featuring a single element.

4.4. Courses Catalogs from Second Period, 1885–1924

During this period, an average of seventy-two mandatory courses were required, with eighteen related to representation, including Freehand Drawing, Pencil Sketching, Charcoal Sketching, Pen and Ink, Watercolors, and Modeling. These courses constituted around 25% of the curriculum, marking an increase compared to the previous period.

By 1920, the course had expanded to twelve semesters. Architecture became the only program with a non-common first semester, distinguished by Freehand Drawing and Drawing and Descriptive Geometry, making freehand drawing instruction exclusive to architecture for the first time. Optional courses from the 1900 and 1905 catalogs showed that 39% of courses were mandatory, with approximately 28% related to representation. By 1985, freehand drawing was included in elementary courses for all students, with advanced coursework available in architecture, biology, and geology.

4.5. Thesis Drawings from Third Period, 1924–1933

This period represented a transition from established trends to the modern movement (Figure 6), with a total of 19 drawings analyzed. Panels became more informative, with a slight predominance of multiple-element panels (n = 11) over single-element ones (n = 9), averaging two drawings per panel. Captions resurfaced, and some panels included blocks of text. Perspectival elevations (n = 12) dominated, followed by sections (n = 11), plans (n = 10), and elevations (n = 5). Flat representations remained prevalent, with no perspectives or details included.

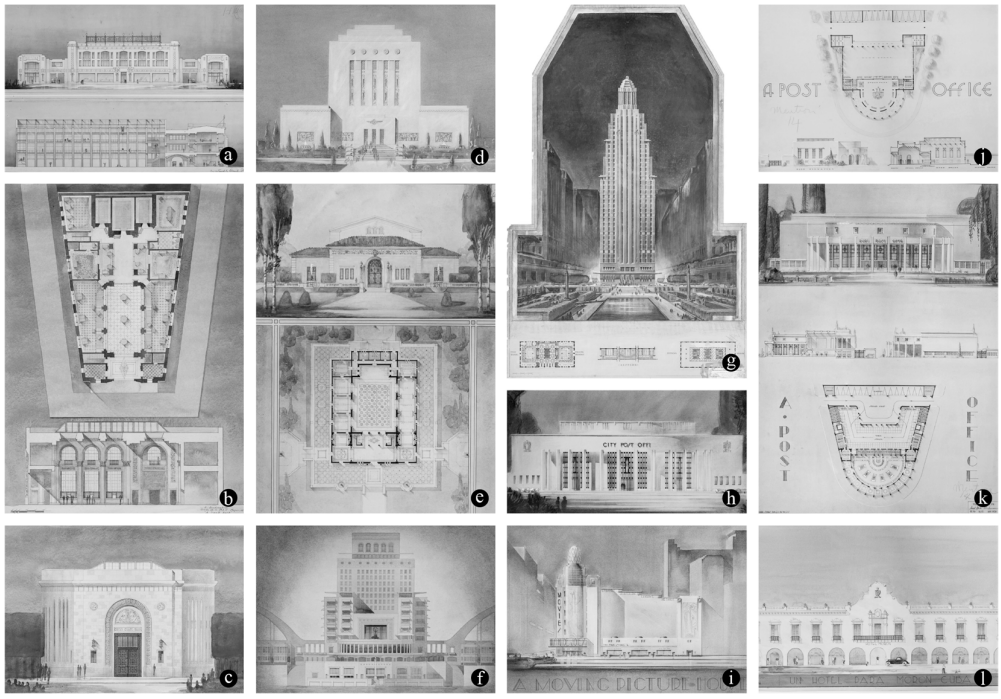


Figure 6. Selection of drawings by students from the third period, 1924 to 1933. (**a**) Automotive Branch Plant by Helen Baxter; (**b**,**c**) A Small Bank by Katharine Buckingham; (**d**) Masonic Temple by Howard Rich; (**e**) Hall for Entertainment by Herbert Beckwith; (**f**) Island Commercial Center by John Walquist; (**g**) Office Building by Robert Hunn; (**h**) Post Office by Robert Moffat; (**i**) A Moving Picture House by William Bowman Cutter; (**j**) Post Office by George Hammond; (**k**) Post Office by John Parker; (**l**) Country Inn by Albert Harmon. Courtesy of MIT Museum.

Realistic renderings in real environments (n = 15) were predominant over abstract settings (n = 3). Urban contexts increased in frequency over natural ones. Atmospheric effects, such as the use of light to add drama, became a defining feature (Figure 6f,g,i). All drawings continued to use hard lines, supplemented by watercolors and other mediums.

Liberty-style buildings marked a departure from revivalist and eclectic trends. This style accompanied new design programs, including large automobile workshops, shopping centers, office towers, and cinemas. Commercial programs (n = 6) and public services (n = 4), particularly post offices, stood out.

4.6. Courses Catalogs from Third Period, 1924–1933

The curriculum during this period averaged ninety courses, with seventeen focused on representation, including Freehand Drawing, Perspective, Shades and Shadows, Watercolors, and Modeling, accounting for 18% of the total curriculum—a reduction compared to the previous period. By 1925, the Drawing Division was integrated into the Architecture Department, and the Watercolors course was offered for the last time.

4.7. Thesis Drawings from Fourth Period, 1933–1968

The fourth period marked the most significant and rapid transformation of the analyzed timeframe (Figure 7). A total of 45 drawings were considered. Panels became highly informative, with many multiple-element panels (n = 27) exceeding single-element ones (n = 18), averaging four elements per panel and occasionally surpassing seven. Panel labeling became standard, accompanied by blocks of text and a diverse arrangement of elements.

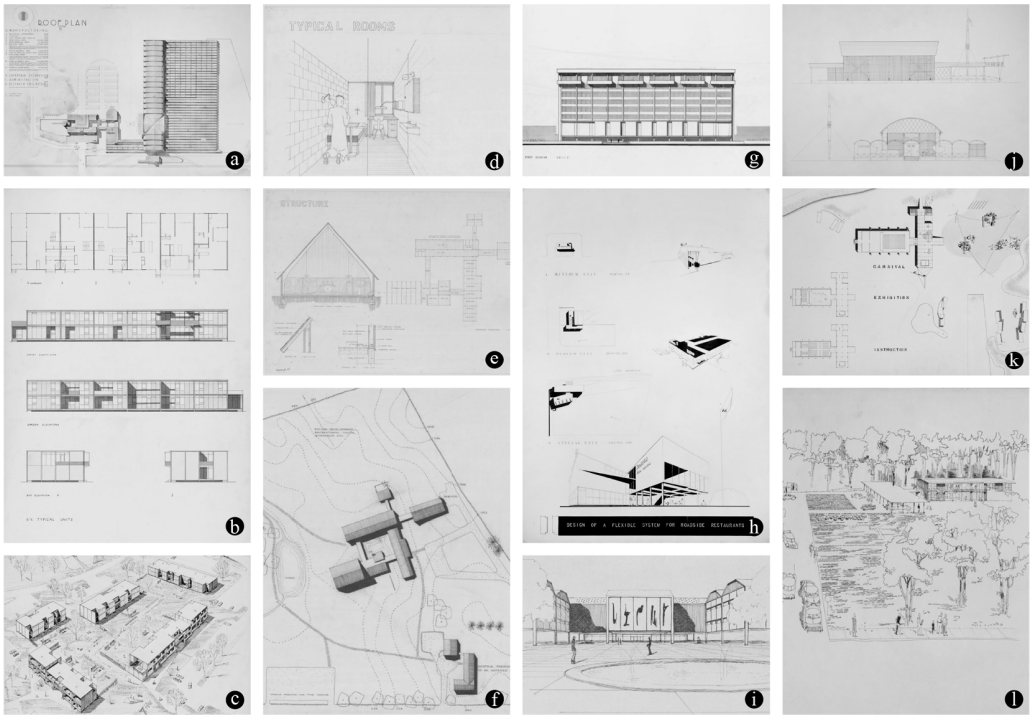


Figure 7. Selection of drawings by students from the fourth period, 1933 to 1968. (**a**) Aircraft Plant by William Brown; (**b**,**c**) Low Multi-Family Housing by John Kniskern; (**d**–**f**) Seminary for the Xaverian Missionary Fathers by William Cavanaugh; (**g**) College of Art for Boston by Josef Nathanson; (**h**) Flexible System for Roadside Restaurants by Harry Weese; (**i**) University of Baghdad by Denis Blackett; (**j**,**k**) Standardized Propaganda Units by M. Pei; (**l**) Highway Motel System by Richard Hamilton. Courtesy of MIT Museum.

This period featured the most diverse range of represented elements. In addition to plans (n = 24), elevations (n = 12), and sections (n = 5), perspectives grew (n = 6) (Figure 7c,h), and details reappeared (n = 6). New elements emerged, including sketches (n = 4) (Figure 7d,i,l), photography and collage (n = 2), maps (n = 2), and perspective construction sections (n = 2). Site analyses and organigrams appeared for the first time.

Representation was mostly hardline (n = 40), with freehand elements (n = 5) making their first appearance. Renderings were limited to elevations and perspectives, with a stylized approach replacing realism. Interior and furniture representations became more common. Constructive aspects gained importance, as constructive details and technology were integrated into architectural drawings (Figure 7e,j). Modernist architectural language dominated, with a focus on private service programs (n = 20), educational and religious facilities (n = 7 each), and industrial buildings (n = 6).

4.8. Courses Catalogs from Fourth Period, 1933–1968

During this period, an average of fifty-six mandatory courses were offered, with six related to representation, including Graphics, Graphic Presentation, Graphics Laboratory (freehand drawing), and Visual Fundamentals. These courses represented nearly 9% of the total. By 1950, the Department of Drawing was renamed Graphics and focused primarily on technical drawing, referred to as Engineering Drawing. By 1965, the curriculum was organized into distinct groups—Visual Design, Architectural Design, Structures, Technology, and History—a structure still in use today.

5. Discussion

5.1. Trends and Shifts

The time range under consideration spans from 1873 to 1968, which encompasses the founding of the architecture course in 1866 and its development until the post-war period. During this time, the institution established itself as an international school, which defined its identity and remains recognizable today.

Archival material, catalogs, and complementary bibliography suggest a set of constants and deviations during this period. Interestingly, the school's proposals are not always reflected in the students' work, particularly in the fourth period. While the first and second periods displayed authentic paintings with great qualities of rendering expressed through color, light, and shadow, there was scarce use of perspective. Panels with only one drawing, especially the perspective elevation, became more frequent in the third period.

This shift in representation does not fully align with the curriculum plans, which emphasize freehand drawing and learning perspective, at least in these thesis drawings. Despite the students' extensive training in various forms and systems of representation, their productions say little about what they have learned. All drawings are rendered, including sections and plans, yet the constructive dimension is almost absent. Captions are also reduced to the point of disappearing, enhancing the painting-like quality of the panels.

During the transition from the third period to the fourth, there was a notable change, and drawings regained their informative character. Various elements were placed on the panels, including diverse forms and representation systems and captions and text blocks, and the constructive dimension gained importance (Figure 8). This shift could be attributed to the immense transformation in construction technology which occurred during this period.

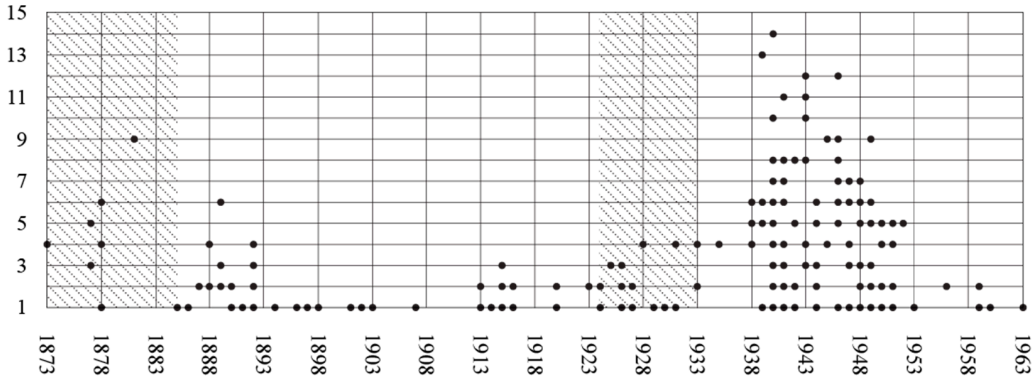


Figure 8. Number of elements per panel. The hatches highlight the different periods under analysis. Authors' figure.

The Neoclassical trend of architecture at that time, marked by the opening of New Technology building in 1916, characterized the second period. In the first three periods, there was a general constant, whether in terms of representation, presentation of the project, architectural style and language, or programs. The fourth period was quite different, reflecting the trend of modern architecture in terms of design and representation but without homogeneity. There was a diversity of paths and references, which was not seen in any of the previous periods. The school's openness to global references, the international influence of the modern movement, and the influx of guest instructors from diverse contexts probably contributed to this diversity.

MIT campus's development after the war, with projects for the Alvar Aalto New Dormitory (1949), the Kresge Auditorium and the MIT Chapel by Eero Saarinen (1955), the I.M. Pei Green Building (1964), and the Student Center by Eduardo Catalano (1968), was characterized by different understandings of architecture, diverse languages, and approaches to design, and it expressed this diversity, which seemed to influence the students.

The representation courses' significance is evident from the curriculum units. From the beginning of this time range, the representation courses exemplified a significant percentage of the total courses, peaking at 29 mandatory courses out of 98 in 1920, corresponding approximately to 30%. There was a progressive decline in the relevance of these courses until 1965, when there was not a single mandatory course but five optional ones. However, this reduction in mandatory representation courses did not seem to decrease the quality of representations, which remained diverse and daring, especially towards the end of the fourth period. Interestingly, it is in the fourth period that the first sketches appear (Figure 9).

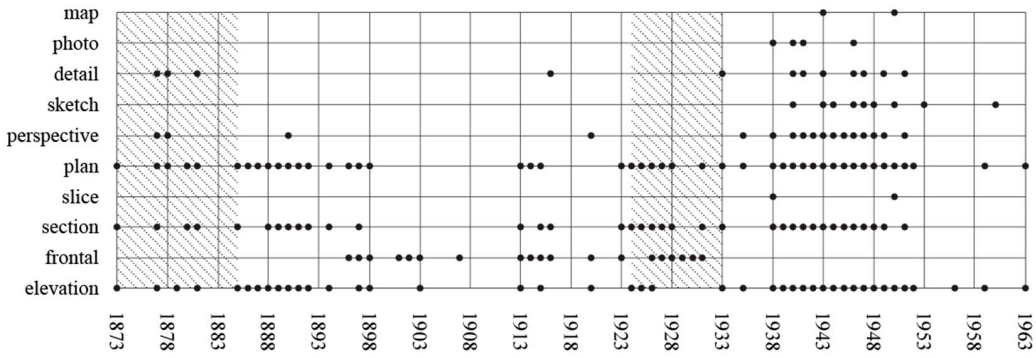


Figure 9. Types of elements in panels. The hatches highlight the different periods under analysis. Authors' figure.

The analysis also reveals other aspects that, unrelated to representation issues, allow us to understand how conceptions and areas of interest have changed historically. Looking at Figure 10, we see how the functional programs of the design projects change in each period. In the first and second periods, cultural programs were highly relevant, shifting to commercial and service programs in the third period and, in the fourth, primarily focusing on housing and education.

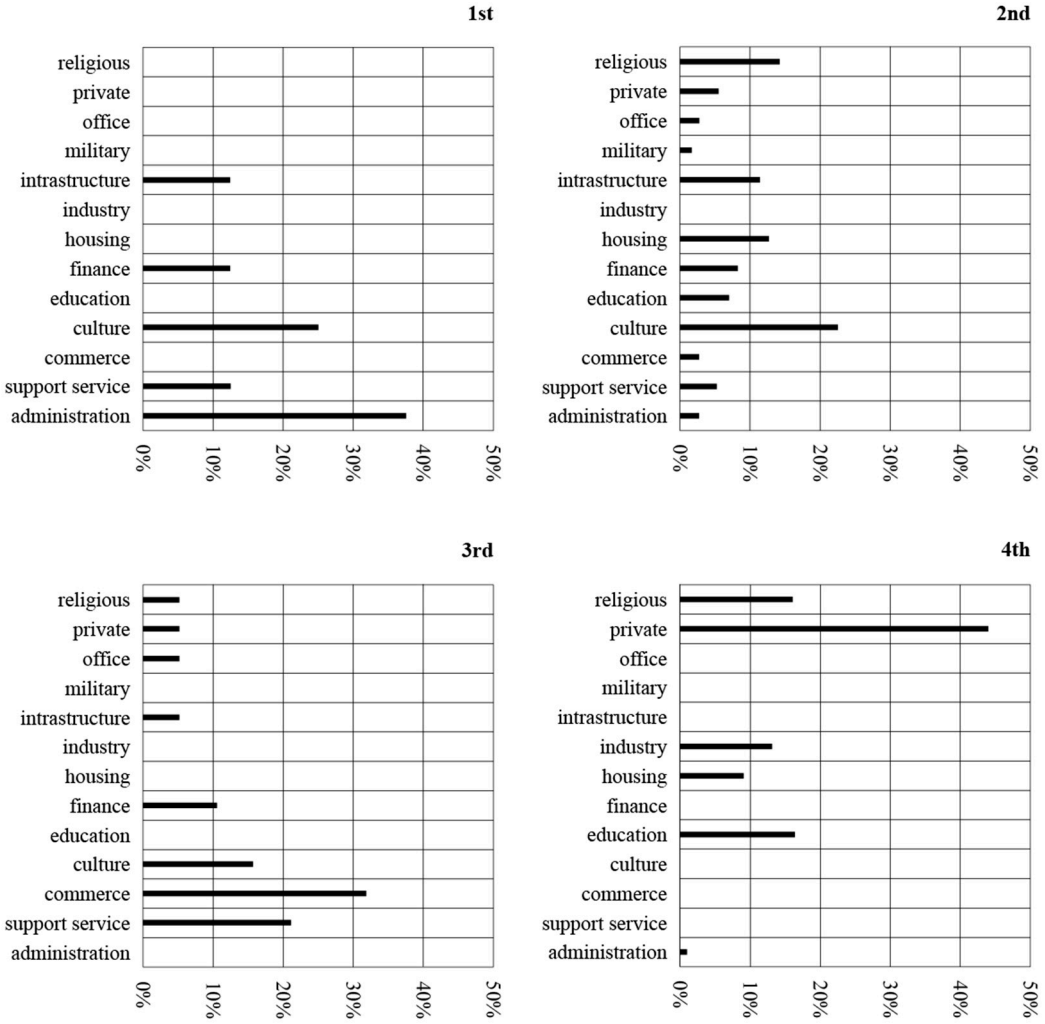


Figure 10. Functional programs of the thesis drawings in the four periods. Authors' figure.

5.2. Hardline and Freehand Drawing

The MIT Department of Architecture has a long history of emphasizing drawing as an essential component of architectural education, as stated by Ware [4]. From the department's inception to the post-war period, drawing served as both a work tool for students and a visual collection for pedagogical purposes. The archive of drawings that we analyzed primarily consists of hardline drawings and renderings, which were the standard for thesis drawings, with only a few freehand drawings from the fourth period. Despite this, we know from the course catalogs that freehand drawing was a mandatory course for students with significant curricular weight.

As noted by Ware [3], drawing in architecture is somewhere between the artist's and the engineer's work. Drawing is partially controlled by factual considerations, partially by the appearance of things, partially by geometric conditions, and partially by the draughtsman's talent and judgment. Ware emphasizes the importance of starting with mathematical

instruments to establish a standard of accuracy but then discontinuing their use as soon as possible to complete the work freehand.

Freehand drawing serves the design process but is then completed or finished in hardline drawing, as we can see in the thesis drawings in the archive. Two curious arguments justified the teaching of freehand drawing in this school, even in courses far from architecture or design. One of them is that freehand drawing is also used as a means of perception to train students to closely observe reality [14]. This explains why observational drawing persisted despite the emergence and widespread use of photography, precisely because it was not just a matter of recording reality but a way for the observer to relate to that reality.

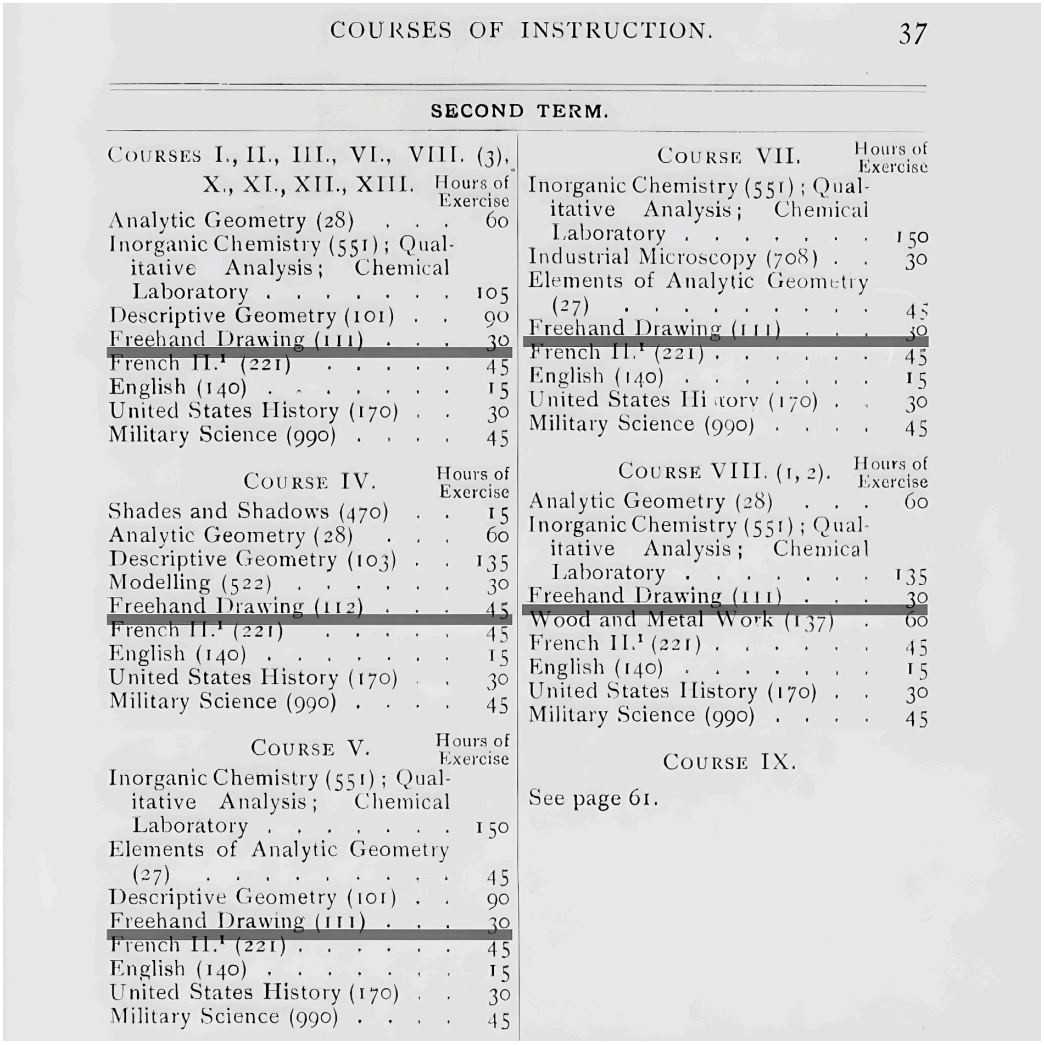
Another argument is the fact that freehand drawing has a significant physical component, and this would be a way to connect the body with the mind in higher education, which tends to be almost exclusively intellectual [14]. Freehand drawing is a procedural tool for the work process and for the training of students. This training includes developing hand dexterity and representational skills, as well as the ability to observe one's environment. In neither of these aspects does the drawing play a role or have a value as a finished product, as a demonstration of talent, virtuosity, or even genius, as Ware stated [3].

Freehand drawing was a mandatory course for all MIT students during their first year, emphasizing memory drawing and speed of execution using various mediums such as pencil, pen and ink, and brush sketching (Figure 11). Biology and geology students were taught specimen drawing, while architecture students were also trained in freehand drawing. However, in 1925, the Division of Drawing was incorporated into the Department of Architecture, and freehand drawing became exclusive to architecture students.

During what we define as the fourth period, which began in the mid-20th century, freehand drawing began to evolve into bold and accelerated perspectives and aerial views. This transformation also emphasized the technical and constructive dimension of the representations and marked a departure from the traditional Fine Arts approach, embracing the vision of the modern movement. The overhaul of representation courses, including the Division of Drawing, led to the introduction of Graphics as a course in 1950.

It is worth noting that the relevance of drawing in the curriculum gradually declined, and by 1965, there was no longer a mandatory drawing course. After the war, Freehand Drawing and Graphics were minimized, and Shades and Shadows and Perspective were eliminated. Instead, the department focused on strengthening studies in urbanism and structural systems to broaden students' understanding of the engineering and science problems associated with architecture.

These changes reflect two conflicting movements. On the one hand, there was a shift in the character of representations influenced by the modern movement, emphasizing the technical and artistic liberation of architecture, as evident in the students' representations. This shift was likely greatly influenced by figures such as Lawrence B. Anderson in the initial phase, as well as the arrival of Walter Gropius as a professor at Harvard in 1937 and the publication of his essay Essentials for Architectural Education (1938). On the other hand, there was a gradual alignment with the path of science and its methods, which would ultimately shape the identity of the department and the entire school, as we will see next.



COURSES OF INSTRUCTION. 37

SECOND TERM.

COURSES I., II., III., VI., VIII. (3), X., XI., XII., XIII.	Hours of Exercise
Analytic Geometry (28)	60
Inorganic Chemistry (551); Qualitative Analysis; Chemical Laboratory	105
Descriptive Geometry (101)	90
Freehand Drawing (111)	30
French II.[1] (221)	45
English (140)	15
United States History (170)	30
Military Science (990)	45

COURSE IV.	Hours of Exercise
Shades and Shadows (470)	15
Analytic Geometry (28)	60
Descriptive Geometry (103)	135
Modelling (522)	30
Freehand Drawing (112)	45
French II.[1] (221)	45
English (140)	15
United States History (170)	30
Military Science (990)	45

COURSE V.	Hours of Exercise
Inorganic Chemistry (551); Qualitative Analysis; Chemical Laboratory	150
Elements of Analytic Geometry (27)	45
Descriptive Geometry (101)	90
Freehand Drawing (111)	30
French II.[1] (221)	45
English (140)	15
United States History (170)	30
Military Science (990)	45

COURSE VII.	Hours of Exercise
Inorganic Chemistry (551); Qualitative Analysis; Chemical Laboratory	150
Industrial Microscopy (708)	30
Elements of Analytic Geometry (27)	45
Freehand Drawing (111)	30
French II.[1] (221)	45
English (140)	15
United States History (170)	30
Military Science (990)	45

COURSE VIII. (1, 2).	Hours of Exercise
Analytic Geometry (28)	60
Inorganic Chemistry (551); Qualitative Analysis; Chemical Laboratory	135
Freehand Drawing (111)	30
Wood and Metal Work (137)	60
French II.[1] (221)	45
English (140)	15
United States History (170)	30
Military Science (990)	45

COURSE IX.

See page 61.

Figure 11. Course catalog from 1905 showing the second term of MIT's first academic year. As underlined in the figure, students from all courses were required to take freehand drawing classes, with more hours allocated to the Architecture course. The courses listed are (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Mining Engineering and Metallurgy, (iv) Architecture, (v) Chemistry, (vi) Electrical Engineering, (vii) Biology, (viii) Physics, and (ix) General Science. Courtesy of the MIT Library Dome.

5.3. The Way of Science

The evolution of the Architecture Department at MIT from the early 1900s to the late 1960s reflects changes in architectural education throughout the United States [15]. Initially, the department followed the tradition of Fine Arts and placed emphasis on freehand drawing as a crucial component of the curriculum.

In the early 1900s, the Architecture Department at MIT faced significant changes in the aftermath of World War I. The enrollment in the program decreased, and many instructors retired or resigned, resulting in an influx of new staff [4]. However, the Fine Arts tradition in the curriculum remained strong, with a focus on the study of key references of Western architectural history and freehand drawing, which was considered an integral part of the program [3]. Students studied historical drawings and artifacts assembled in the drawing-room and the Museum of Fine Arts.

However, drawing gradually diminished in importance as the primary focus of architectural education, with greater emphasis placed on the "act of making". Technological advancements led to a shift where craftsmanship and fabrication took precedence over

traditional drawing methods. The motto of MIT mens et manus (mind and hand), which emphasizes both knowledge and its application in the real world, became the guiding principle of the department. This shift towards a more technological approach to architecture continued to be a distinctive aspect of the MIT architecture course today [16].

During World War II, architecture was not seen as a necessary discipline, unlike other courses that received exemptions from military service, so the department was greatly affected by the mobilization of students for the war effort. The wartime context and the applied research that was conducted, focusing on radar, computing, systems integration, and uranium studies, marked a significant institutional growth, transforming it from an important school in the American context to a global-scale institution. An expression of this growth is that before the war, MIT had a budget of USD 300,000 for the entire institute, whereas during the war, in five years, it received USD 116 million [15].

The integration of MIT's Architecture Department into a more scientific and technological realm appears to be linked with the transition of deanship from William Wurster to Pietro Belluschi in 1950. Belluschi emphasized the importance of a technological approach that made use of MIT's laboratories, courses in materials, and subjects such as sanitation, acoustics, illumination, and heating and ventilation. He believed that architecture was an art, but technology was the means of architecture. Thus, Belluschi brought the Architecture Department closer to the core of the institution, which had asserted itself in the post-war period.

6. Conclusions

Returning to our initial question—what insights do student hand drawings offer about their institution?—this study demonstrates that these materials, more than historical records, serve as valuable indicators of pedagogical changes and evolving institutional values. The relevance of these thesis drawings becomes especially evident when combined with the corresponding curricular programs, allowing us to reveal both alignments and dissonances between educational intentions and their manifestations in students work.

So, what do these drawings reveal? Firstly, they trace the evolution of pedagogical approaches, illustrating shifts in program offerings and changes in courses related to hand drawing and representation. In the institution's early years, hand drawing had its own autonomous department and was a mandatory subject for all courses, serving as a core element of the school's educational model. Over time, its curricular presence progressively diminished, becoming exclusive to the architecture program and shifting from a key subject to a complementary one.

These drawings are also indicators of design trends and shifts in representation. Across the four periods analyzed, a clear correspondence emerges between architectural language and its visual portrayal, suggesting a close relationship between architectural and representation forms. Furthermore, they reflect broader cultural and social contexts, including the emergence of modernism and the transformative impact of events like World War II on the institution's trajectory.

This study underscores the importance of institutional archives in preserving educational legacies. The systematic collection and digitization of student work, as Robert William Ware emphasized, are not only valuable for students and instructors, enabling them to learn from preceding works, but also serve as crucial evidence for accessing the institution's history and its changing educational approach.

However, some limitations must be mentioned. The analysis was based on 413 digitized thesis drawings from an archive of 7293, with 145 selected for detailed examination. This relatively narrow sample was unevenly distributed over time, with some periods well-represented and others scarcely covered. Additionally, the analysis of curricular plans

could be expanded to include details such as weekly class hours, types of exercises, course descriptions, classes organization, and even instructor information. Another limitation is the lack of cross-institutional research, as this study does not account for concurrent developments at other architecture schools in the United States.

For future work, expanding the sample would be essential to deepen insights and ensure more consistent coverage of the study period. Additionally, refining the research methodology to support large-scale analysis, including automated processes for processing visual and textual evidence, would enable more comprehensive insights. Such advancements would not only broaden understanding of the institution's history but also contribute meaningfully to digital humanities research.

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