

The modernization of future specialists' professional training in the field of advertising design in HEIs



Halyna Bryukhanova ^{1,*}, Cherniavskiy Kostiantyn ², Iryna Udrys ³, Alina Marchenko ⁴, Taisiia Bielofastova ⁵

¹Department of Journalism and Advertising, Kyiv National University of Trade and Economics, Kyiv, Ukraine

²Department of Fine Arts and Restoration, National Academy of Fine Arts and Architecture, Kyiv, Ukraine

³Department of Fine Arts, Kryvyi Rih State Pedagogical University, Kryvyi Rih, Ukraine

⁴Department of Applied and Decorative Arts and Design, Kryvyi Rih State Pedagogical University, Kryvyi Rih, Ukraine

⁵Department of Advertising and Public Relations, Borys Grinchenko Kyiv University, Kyiv, Ukraine

ARTICLE INFO

Article history:

Received 24 November 2021

Received in revised form

7 February 2022

Accepted 7 February 2022

Keywords:

Advertising design

Professional training

Educational training program

Modernization of professional training

ABSTRACT

The advertising design profession is becoming increasingly popular in various markets as employers recognize the importance of marketing in selling a product. The introduction of technology in higher education (HEIs) has contributed to the development of professional training programs for future specialists in the field of advertising design. This article aims to form recommendations for modernizing the professional training of future specialists in the field of advertising design in HEIs. The study proposed a comprehensive systematic and problem-oriented approach to the modernization and development of professional training programs for specialists in the field of advertising design. The abilities, types of knowledge of advertising designers, skills, and working styles of advertising design specialists are investigated using the examples of Germany, Italy, and Poland in the context of survey data of employers and design professionals regarding the lack, excess of the relevant type of competencies. The significance lies in refuting the thesis that professional training programs lag behind the needs of the labor market, and thus the need for modernization of HEIs education. It happens since countries differ in the characteristics of the design market, where there may be both a shortage and an excess of skills.

© 2022 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The profession of an advertising designer is becoming more and more popular in different markets, as employers recognize the importance of marketing to sell a product. There is a growing demand for the work of a designer: Employers are seeking to attract specialists in advanced technical, digital, creative abilities and skills to create additional product value through advertising and more effective promotion of the product in the market. Design is a resource for the most innovative companies. The volume of the global design market will grow steadily. Consequently, the market growth rate will be 5.1% in 2021 compared to 2020 (the market size was \$41.8 billion by revenue) (IBISWC, 2021).

The advertising design influences purchasing behavior by providing potential sales growth through the creative design of packaging, logos, and other advertising elements (Laing et al., 2017). The emergence of new technologies, such as multidimensional integrated design technologies thanks to artificial intelligence, ensures the development of this field, its expansion (Wu, 2020). As a result, the style and practice of professionals are significantly changing, contributing to the transition to digital methods of creating advertising. As a result, the set of tasks, functions, responsibilities of the designer changes, which should be taken into account in professional training programs.

The introduction of technology in higher education (HEIs) contributed to the training program's development for future professionals in the advertising design field. The development of specialist training programs is primarily related to technical, digital competencies (abilities, knowledge, skills, working styles), creativity, the ability to think creatively (Ramadhani et al., 2018). The mentioned competencies of designers can be developed thanks to technologies already in the process of training, in

* Corresponding Author.

Email Address: sundow.galya@gmail.com (H. Bryukhanova)

<https://doi.org/10.21833/ijaas.2022.04.004>

Corresponding author's ORCID profile:

<https://orcid.org/0000-0002-1664-8990>

2313-626X/© 2022 The Authors. Published by IASE.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

particular when HEIs and employers cooperate in the creation of advertising products.

This article aims to formulate recommendations for modernizing the future specialists' professional training in the field of advertising design at HEIs.

2. Materials and methods

The research proposes a combination of two approaches to modernization and development of professional training programs for advertising design specialists:

- 1) a comprehensive system approach to the formation of professional competence, including the development of abilities, knowledge, skills, working styles of students in the learning process.
- 2) a problem-oriented approach to modernization of professional training, which involves understanding the problems both future specialists will face in the work process, and employers, requiring from future specialists a certain set of competencies.

In this context, the features of the current state of professional competence of design professionals are investigated using the competence classification proposed by ONET, which includes abilities, knowledge types, skills, and work styles:

1. Abilities: Enduring attributes of the individual that influence performance.
2. Knowledge types: Organized sets of principles and facts applying in general domains.
3. Skills: Developed capacities that facilitate learning or performance, including basic skills.
4. Work styles: Personal characteristics that can affect how well someone performs a job.

The abilities, types of knowledge of advertising designers, skills, and working styles are investigated on the example of Germany, Italy, and Poland in the context of the survey data of employers and design professionals regarding the lack, excess of the relevant type of competence. Each type of ability, knowledge, skill, and working style is rated from -1 (excess) to +1 (deficit). Such structure of studying competencies, which are formed in the process of professional training (identification, development of abilities, types of knowledge of designers) and the process of practical work experience (skills, working styles), allows using a comprehensive approach to the formation of recommendations for modernization of professional training programs for specialists in the advertising design industry.

3. Results and discussion

An advertising designer is a developer of visual product content for communication and promotion purposes based on the company's concept and the use of computer software. Advertising is a method of

communication with consumers, an inventory of product realization, delivery of value, information about the product, interaction with consumers of the product. Design displays the product concept through color, logo, images that contain the marketing idea (Bridges, 2013). The advertising designer collaborates with programmers, photographers, illustrators, editors, and others involved in graphic design and communication to best represent the idea. Graphic design solves the problems of product objectives in the marketplace, visual depiction of the product for consumers to understand its functions (Walker, 2017). Therefore, the role of advertising design is constantly growing, because advertising is becoming the main one of the ways to increase and retain sales. The advertising designer can perform a variety of activities: media, information, and communication, branding, traditional or Internet marketing (Bennett et al., 2017). The advertising designer transforms an idea into a visual solution to ensure consumers understand the value of the product (Dong et al., 2021). The designer plays the role of "message and image shapers" (Meggs and Purvis, 2016). Given the different roles of an advertising designer, a person's competence should combine the abilities, knowledge, skills, and personal work styles that are identified and developed through professional training.

The literature actively discusses the development of designer competence through professional training programs in HEIs, particularly the combination of theory and practice, abilities, knowledge and skills, effective optimization of technical, digital, creative designer skills (Ambrose et al., 2019; Chiang et al., 2018; Dong et al., 2021), practical and artistic knowledge and skills, the ability to interpret and reflect employers and users' needs of the final design product (Bresciani, 2019; Bonnardel et al., 2018). The separate research areas are the study of conceptual, technical design, and the use of software to develop designers' technical skills, managing advertising design processes (Dziobczenski et al., 2018). Design process management competencies include knowledge, skills between personal communication, social interaction, and the ability of designers to collaborate in teams (employers indicate teamwork skills in advertising designer job ads 80% of the time). Competencies within conceptual design include knowledge, skills to execute a personalized design advertising product focused on solving the problem of the customer and its consumers (Lowell and Moore, 2020).

Competencies within the technical design of advertising design include knowledge and skills in coding the interface, visual image of the product. Competencies in the use of the software by an advertising designer include technical, digital skills in the use of 2D software (Adobe Illustrator, Photoshop, InDesign). A separate competency category is the personal characteristics of the advertising designer, specific thinking, aesthetics,

professionalism, stress tolerance, self-control (Dziobczenski et al., 2018; Chiang et al., 2019).

The literature also explores the problem of the constant need for modernization of professional training programs for designers due to the changing needs of employers in the knowledge, skills, styles of work of designers, which is associated with the emergence of narrow specializations in this field. The need for ongoing modernization of design professional training programs is particularly urgent. In research by Frascara (2004) and Heller (2015), the authors highlighted the priorities of teachers and HEIs in this area: The development of technical and digital skills of the advertising designer and general skills (planning, management, complex problem solving, understanding the design customer problem). HEIs face the challenges of constantly motivating students to develop a complex system of abilities, knowledge, skills, the challenges of constantly reviewing and updating their competencies, educational programs that are often outside of design education (Dziobczenski and Person, 2017).

Professional training programs for design professionals aim to transfer knowledge from instructor to student, building technical skills to create advertising s with the aim of further employment in the initial stages of work. Gradually, the specialist forms their work styles and skills, together with traditional knowledge and natural abilities, providing competence development. New challenges in the design job market require an expanded range of highly specialized knowledge, skills, and work styles, requiring HEIs to incorporate an additional set of knowledge, skills outside of the traditional field into their training programs. Bhebhe (2018) carried out a classification of designers' competencies according to the following components: "cognitive, functional, personal, moral, and purpose competencies" (Bhebhe, 2018), Table 1.

The appearance of a new skills' set in advertising design through the development of the digital information environment and personalized design requires professionals to develop a set, sophisticated system of knowledge, skills to address the individual needs of employers and end-users (Gaimei and Xueling, 2019). The trend toward personalization in design is noted in Javan and Zeman (2018), "The graphic designers' skills can be used in creating highly customized 3D-printed models. "At the same time, a set of competencies is difficult to define "the type of skills and thinking that students must evidence are difficult to define" (Giloj and Du Toit, 2013). The difficulty in defining the necessary competency framework, which should be the ultimate goal of HEIs training programs, is related to the regional characteristics of labor markets. While Han and Bromilow (2010) argued for the priority of building leadership competencies for designers in leadership positions, Wragg and Barnes (2016) pointed to the priority role of "user-centered design" or problem-oriented thinking skills.

Therefore, the literature has formed the main goals and objectives of an advertising designer, identified the shortcomings of professional training, and formed a system of competencies of designers. However, the literature lacks comprehensive studies of the correspondence of professional training of advertising designers to the needs of labor markets at the regional level, as a consequence, prospects, and recommendations for modernization of educational programs of HEIs training.

Table 1: The components of graphic designers' competencies (Bhebhe, 2018)

Competencies groups	List of competencies
1. Cognitive	1.1 Design Fundamentals
	1.2 Industry Knowledge
	1.3 Contextual Awareness
	1.4 Multidisciplinary Knowledge
	1.5 Business Fundamentals
	1.6 Marketing Fundamentals
2. Functional	2.1 Technical Design Skills
	2.2 Conceptual Design Skills
	2.3 Interactive Design Skills
	2.4 Advertising Design Skills
	2.5 Software Skills
3. Personal	2.6 Graphic Print Production Skills
	2.7 Project Management Skills
	3.1 Aesthetic and Visual Sensitivity
	3.2 Self-driven
	3.3 Adaptability and Flexibility
	3.4 Emotional Intelligence
4. Ethical	3.5 Interpersonal Skills
	3.6 Self-efficacy
	4.1 Professional Behaviors
5. Metacompetence	4.2 Professional Expertise
	4.3 Professional Values
	5.1 Creative Thinking Skills
	5.2 Problem Solving Skills
	5.3 Design Thinking Skills
	5.4 Critical Thinking Skills
	5.5 Reflective Thinking Skills
	5.6 Communication Skills
	5.7 Teamwork and Leadership Skills

Professional training of future design professionals in the EU countries is focused on students' and teachers' knowledge transfer, their practical use to build skills and abilities. Within the EU, the needs of the design market in specialists are met by networks of public-private institutes and design schools. For example, in Germany, there are 290 training programs offered by 120 design schools in higher education, of which 15 are private institutions. The design market employs 147,300 professionals (as of 2018), of which 24% are employed in the graphic and communication design sub-sector, 19% in interior and environmental design, 7% in industrial and product design, and 50% in other sub-sectors. Germany has developed and is being implemented a regional policy of design and a national strategy for the creative industries. For comparison, in Italy there are considerably fewer specialists—48.163 designers are employed in the industry in 29201 design firms, of which 25.4% are graphic and communication designers, 14.5% are product and industrial specialists, 24.8% are fashion designers, 7% are digital designers, and 22% are working in other design fields. Italy also has

much fewer schools—89, of which there are 19 universities, graduating 7094 designers of different specialties every year. The Polish design services market is much smaller: 8 000 designers offer their services, 6500 of them are self-employed. There are only 21 design schools in Poland, out of which 9 universities, graduating 1500 specialists every year. 35% of all specialists are graphic or communication designers, 30% are environment and interior designers, 15% are fashion and textile designers, 10% are product and industrial designers, 5% are illustrators and 5% are others. Thus, the specialist market in Poland is less diversified, with a large proportion of advertising designers.

Germany shows the greatest lack of thinking abilities (score 0.149), in particular: Freedom of expression of ideas, originality, understanding, and vision of the problem, deductive and inductive thinking, information management, flexibility in performing different categories of tasks (Table 2). Italy and Poland differ from Germany: Italy is found to have almost no lack or excess of individual design professionals' abilities, which may be due to differences in the design market. In Poland, all design capabilities are in abundance without singling out a particular group.

Table 2: Shortage/surplus estimates for design professionals in Germany, Italy, and Poland, 2020 (OECD, 2021)

	Germany	Italy	Poland	European Union
Verbal Abilities	0.195	0.07	-0.035	0.081
Oral Comprehension	0.2	0.062	-0.043	0.079
Written Comprehension	0.191	0.079	-0.035	0.083
Oral Expression	0.203	0.061	-0.034	0.081
Written Expression	0.185	0.079	-0.027	0.082
Reasoning Abilities	0.149	0.046	-0.028	0.06
Fluency of Ideas	0.143	0.046	-0.014	0.058
Originality	0.141	0.042	-0.012	0.057
Problem Sensitivity	0.172	0.041	-0.041	0.065
Deductive Reasoning	0.171	0.054	-0.034	0.069
Inductive Reasoning	0.162	0.059	-0.027	0.069
Information Ordering	0.13	0.042	-0.037	0.055
Category Flexibility	0.123	0.037	-0.031	0.048
Quantitative Abilities	0.082	0.036	-0.033	0.035
Memory	0.086	0.024	-0.012	0.033
Perceptual Abilities	0.089	0.021	-0.023	0.033
Spatial Abilities	0.042	0	-0.018	0.011
Spatial Orientation	0.005	-0.009	-0.01	-0.003
Visualization	0.079	0.009	-0.027	0.026
Attentiveness	0.091	0.016	-0.025	0.032
Selective Attention	0.105	0.024	-0.027	0.039
Time Sharing	0.077	0.008	-0.024	0.025
Cognitive Abilities	0.124	0.038	-0.027	0.049
Fine Manipulative Abilities	0.025	-0.023	-0.027	-0.001
Control Movement Abilities	0.012	-0.02	-0.019	-0.006
Reaction Time and Speed Abilities	0.004	-0.013	-0.012	-0.004
Psychomotor Abilities	0.014	-0.019	-0.019	-0.004
Flexibility. Balance and Coordination	0.003	-0.025	-0.014	-0.008
Strength and Flexibility	0.006	-0.029	-0.016	-0.008
Visual Abilities	0.045	0.005	-0.019	0.014
Near Vision	0.14	0.045	-0.04	0.058
Far Vision	0.091	0.013	-0.028	0.031
Visual Color Discrimination	0.054	0.001	-0.025	0.015
Night Vision	0.001	-0.003	-0.005	-0.001
Peripheral Vision	0.002	-0.005	-0.005	-0.002
Depth Perception	0.021	-0.016	-0.022	-0.001
Glare Sensitivity	0.003	-0.004	-0.008	-0.002
Auditory and Speech Abilities	0.084	0.019	-0.02	0.03
Sensory Abilities	0.061	0.011	-0.019	0.021

In Germany and Italy, there is a deficit in the types of knowledge of designers, in particular, because of the narrow specialization of professional training programs compared to Poland, where there are significantly fewer training programs and institutions (Fig. 1). Thus, the narrow specialization of advertising designers requires universities to generate new knowledge, which, in turn, requires increased cooperation with practicing designers and employers. It seems that the relatively large design market in Germany requires design schools to intensify their training, in particular the active

development of advertising creation skills already during the students' education. In contrast to Italy, where there is an almost non-existent deficit of different types of skills, in Germany, there is a particularly acute need to develop basic content (deficit score 0.145), process (deficit score 0.147), social skills (deficit score 0.142), skill complex (deficit score 0.14), and system skills (deficit score 0.122). While Italy was found to have a low, almost non-existent skill deficit, Poland was found to have a low, almost non-existent, skill surplus of design professionals (Table 3).

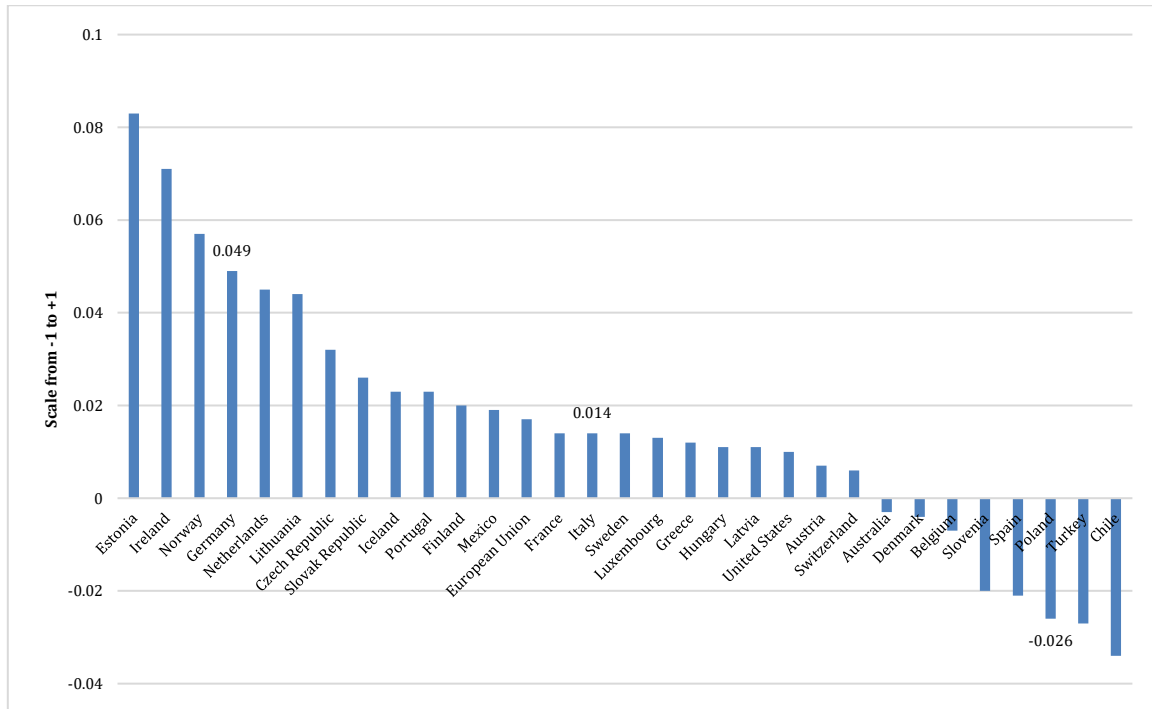


Fig. 1: Shortage/surplus estimates of knowledge types of design professionals in Germany, Italy, and Poland compared to other EU countries, 2020 (OECD, 2021)

Table 3: Shortage/surplus estimates for design professionals' skills in Germany, Italy, and Poland, 2020 (OECD, 2021)

Skills type	Germany	Italy	Poland	European Union
Basic Skills (Content)	0.145	0.054	-0.025	0.061
Basic Skills (Process)	0.147	0.044	-0.027	0.062
Critical Thinking	0.177	0.061	-0.036	0.074
Active Learning	0.145	0.053	-0.023	0.065
Learning Strategies	0.116	0.03	-0.009	0.05
Monitoring	0.151	0.032	-0.042	0.058
Social Skills	0.142	0.032	-0.033	0.051
Social Perceptiveness	0.177	0.037	-0.036	0.06
Coordination	0.136	0.025	-0.047	0.05
Persuasion	0.152	0.042	-0.032	0.055
Negotiation	0.136	0.044	-0.034	0.053
Instructing	0.117	0.029	-0.017	0.047
Service Orientation	0.134	0.016	-0.036	0.039
Complex Problem-Solving Skills	0.14	0.049	-0.027	0.06
Technical Skills	0.02	0.002	-0.011	0.005
Operations Analysis	0.077	0.027	-0.015	0.033
Technology Design	0.023	0.007	-0.002	0.009
Equipment Selection	0.005	-0.003	-0.005	-0.001
Installation	0.003	0.001	-0.001	0
Systems Skills	0.122	0.042	-0.022	0.054
Judgment and Decision Making	0.151	0.052	-0.027	0.066
Systems Analysis	0.105	0.04	-0.02	0.048
Systems Evaluation	0.11	0.035	-0.018	0.047
Resource Management Skills	0.072	0.018	-0.041	0.032
Time Management	0.123	0.036	-0.041	0.051
Management of Financial Resources	0.036	0.011	-0.044	0.02
Management of Material Resources	0.033	0.003	-0.036	0.017
Management of Personnel Resources	0.095	0.024	-0.041	0.041

The countries also differ in the style of designers' work, which is formed in specialists during their professional training. Germany especially lacks such personal characteristics as achievement orientation, result orientation (effort, persistence, initiative), leadership qualities, interpersonal cooperation, social orientation, self-control, stress-resistance, adaptability and flexibility, conscientiousness, independence, and practicality (innovativeness, innovativeness). On the opposite, in Italy, there is practically no deficit of the mentioned personal

qualities of specialists, while, in Poland, there is practically no surplus (Table 4).

The study provides evidence of significant differences in the professional training of designers in different countries, depending on the market of design services, its state, specialization, development, the need for highly specialized specialists. Consequently, the diversified German design market signals the need to modernize the professional training of advertising designers due to the identified deficits of abilities, knowledge, skills of specialists. Despite the current 290 training

programs for designers, Germany needs to look at the different sets of skills of students to be formed during the training. Consequently, HEIs training programs should build new knowledge and provide students with the choice of taking additional courses to understand new trends in design. In comparison,

the Italian and Polish markets differ significantly in terms of both the volume of designer services and the number of educational programs, the number of design schools, the number of professionals on the market, and the number of graduates.

Table 4: Shortage/surplus estimates of design professionals' working styles in Germany, Italy, and Poland, 2020 (OECD, 2021)

Type of Work Style	Germany	Italy	Poland	European Union
Achievement Orientation	0.288	0.078	-0.075	0.109
Achievement/Effort	0.278	0.072	-0.071	0.103
Persistence	0.293	0.084	-0.071	0.113
Initiative	0.295	0.077	-0.084	0.11
Social Influence	0.261	0.046	-0.088	0.096
Leadership	0.261	0.046	-0.088	0.096
Interpersonal Orientation	0.271	0.034	-0.081	0.085
Cooperation	0.296	0.048	-0.101	0.097
Concern for Others	0.273	0.033	-0.077	0.084
Social Orientation	0.245	0.021	-0.065	0.074
Adjustment	0.296	0.048	-0.086	0.101
Self-Control	0.296	0.039	-0.09	0.096
Stress Tolerance	0.302	0.054	-0.085	0.105
Adaptability/Flexibility	0.29	0.051	-0.084	0.102
Conscientiousness	0.319	0.065	-0.109	0.112
Dependability	0.32	0.057	-0.112	0.11
Attention to Detail	0.308	0.069	-0.107	0.109
Integrity	0.328	0.068	-0.108	0.115
Independence	0.261	0.059	-0.083	0.095
Practical Intelligence	0.269	0.078	-0.057	0.105
Innovation	0.248	0.056	-0.052	0.092
Analytical Thinking	0.29	0.099	-0.061	0.118

If in Italy revealed virtually no deficit of abilities, knowledge, skills design specialists, in Poland virtually no excess, in particular, because of the poorly developed design market, a large part of the classical professions in this field. Therefore, in Germany, it is advisable to prioritize sets of skills, knowledge, skills depending on the specialization of the future specialist. Heller (2015) discussed the problems of teachers' priorities in design education in the context of technical design skills, more general skills (planning and design, management, complex problem solving), software application. Teachers have the function of encouraging students-future designers to develop competencies, encouraging the learning of new skills outside of HEIs training and education programs (Dziobczenski and Person, 2017). However, it is advisable to transfer this function to the students themselves, simply by introducing them to the range of potential specializations in the labor market. In this way, the student may be interested in learning about the cases of different companies and choosing a person's profession.

Design industry employers emphasize "practical experience" more than "academic qualifications" when hiring designers. However, it is impossible to form a complex system of full-fledged competencies of a designer during training, especially as regards creative thinking, problem-oriented, critical thinking, and sensitivity to the final product. These competencies are formed only in the process of constant work, rather than learning and receiving basic knowledge. As the research shows, design schools, especially in Italy and Poland, form effective

sets of competencies with insufficient deficits of knowledge, skills, and abilities. Narrowly specialized skills can be formed only with the specialist's feeling of need for them, with a high interest in the profession if he has experience in a certain design specialty. To do this, the professional can take advantage of informal training and training programs (Chiang et al., 2018). Design educators and HEIs should not constantly be working to modernize training programs. The focus should be on the deep theoretical knowledge that serves as the foundation of any highly specialized position in advertising design. Narrowly specialized skills are formed only with long-term work and practice in the design field, which is not enough during training at HEIs.

4. Conclusion

The professional training of future design professionals in the EU countries is focused on students' and teachers' knowledge transfer, their practical use to build skills and abilities. Within the EU, the needs of the design market in specialists are met by networks of public-private institutes and design schools. The domestic design market determines the specialization of educational training programs for advertising design professionals. In Germany, there are 290 training programs offered by 120 design schools in higher education, of which 15 are private institutions. There are 147,300 professionals employed in the design market. To compare, Italy has a much smaller number of professionals—48,163 designers are employed in the industry in 29201 design firms. Italy has far fewer

schools–89, of which 19 universities, graduating 7,094 designers of various specialties each year. The Polish design market is much smaller: 8,000 designers offer their services, of which 6,500 are self-employed. There are only 21 design schools in Poland, of which 9 are universities. At the same time, in Germany, the lack of thinking abilities, the lack of types of knowledge of designers, the lack of basic content, process, social skills, complex problem-solving skill, and system skills are found. Italy traditionally has the highest quality professional training programs in design and therefore revealed almost no lack or excess of individual abilities of design professionals, the sufficiency of different types of knowledge of designers, almost no deficit of different skills types, which may be related to the differences in the design services market. Poland has a much smaller number of training programs and educational institutions, and all the abilities, knowledge, and skills of designers are in abundance without singling out a particular group. It seems that the relatively large market for design services in Germany requires design schools to strengthen the training of specialists, in particular, the active development of advertising creation skills as early as during student training.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

- Ambrose G, Harris P, and Ball N (2019). *The fundamentals of graphic design*. Bloomsbury Publishing, London, UK.
- Bennett AG, Cassim F, and Van der Merwe M (2017). How design education can use generative play to innovate for social change: A case study on the design of South African children's health education toolkits. *International Journal of Design*, 11: 57-72.
- Bhebhe L (2018). *Multicultural narratives in graphic design teaching and learning for diverse audiences at a University of Technology*. Ph.D. Dissertation, Cape Peninsula University of Technology, Cape Town, South Africa.
- Bonnardel N, Wojtczuk A, Gilles PY, and Mazon S (2018). The creative process in design. In: Lubart T (Ed.), *The creative process: Perspectives from multiple domains*: 229-254. Springer, Berlin, Germany.
https://doi.org/10.1057/978-1-137-50563-7_9
- Bresciani S (2019). Visual design thinking: A collaborative dimensions framework to profile visualizations. *Design Studies*, 63: 92-124.
<https://doi.org/10.1016/j.destud.2019.04.001>
- Bridges AW (2013). *Identification of perceived 21st century graphic design skills, content knowledge, and tools needed in an effective university-level graphic design program*. Ph.D. Dissertation, Gardner-Webb University, North Carolina, USA.
- Chiang WSI, Dris MZ, and Chuen TW (2018). What makes an undergraduate graphic design education valuable? *Journal of Education and Social Sciences*, 11(1): 73-82.

- Chiang WSI, Dris MZ, and Chuen TW (2019). Is graphic design being taken seriously as a profession. *Journal of Arts and Social Sciences*, 3(1): 1-9.
- Dong Y, Zhu S, and Li W (2021). Promoting sustainable creativity: An empirical study on the application of mind mapping tools in graphic design education. *Sustainability*, 13(10): 53-73.
<https://doi.org/10.3390/su13105373>
- Dziobczanski PRN and Person O (2017). Graphic designer wanted: A document analysis of the described skill set of graphic designers in job advertisements from the United Kingdom. *International Journal of Design*, 11(2): 41-55.
- Dziobczanski PRN, Person O, and Meriläinen S (2018). Designing career paths in graphic design: A document analysis of job advertisements for graphic design positions in Finland. *The Design Journal*, 21(3): 349-370.
<https://doi.org/10.1080/14606925.2018.1444874>
- Frascara J (2004). *Communication design: Principles, methods, and practice*. Allworth Communications. New York, USA.
- Gaimei C and Xueling Y (2019). Analysis of the idea of individualized graphic design in information art and design. In *the International Conference on Art Design, Music and Culture*, Guangzhou, China: 163-168.
- Giloi S and Du Toit P (2013). Current approaches to the assessment of graphic design in a higher education context. *International Journal of Art and Design Education*, 32(2): 256-268. <https://doi.org/10.1111/j.1476-8070.2013.01758.x>
- Han JY and Bromilow D (2010). Graphic designers win the leadership game. *Design Management Journal*, 5(1): 20-31.
<https://doi.org/10.1111/j.1948-7177.2010.00011.x>
- Heller S (2015). *The education of a graphic designer*. Simon and Schuster, New York, USA.
- IBISWC (2021). *Global graphic designers–market. Size 2004–2027*. IBIS World Company, Los Angeles, USA.
- Javan R and Zeman MN (2018). A prototype educational model for hepatobiliary interventions: Unveiling the role of graphic designers in medical 3D printing. *Journal of Digital Imaging*, 31(1): 133-143.
<https://doi.org/10.1007/s10278-017-0012-4>
PMid:28808803 PMCID:PMC5788818
- Laing S, Apperley M, and Masoodian M (2017). Investigating the effects of client imagery on the ideation process of graphic design. *Design Studies*, 53: 78-98.
<https://doi.org/10.1016/j.destud.2017.08.001>
- Lowell VL and Moore RL (2020). Developing practical knowledge and skills of online instructional design students through authentic learning and real-world activities. *TechTrends*, 64: 581-590. <https://doi.org/10.1007/s11528-020-00518-z>
- Meggs PB and Purvis AW (2016). *Meggs' history of graphic design*. John Wiley and Sons, Hoboken, USA.
- OECD (2021). *Skill needs–Industries*. Organisation for Economic Co-operation and Development, Paris, France.
- Ramadhani S, Saide S, and Indrajit RE (2018). Improving creativity of graphic design for deaf students using contextual teaching learning method (CTL). In *the 2nd International Conference on Information System and Data Mining*: 136-140.
<https://doi.org/10.1145/3206098.3206128>
- Walker S (2017). Research in graphic design. *The Design Journal*, 20(5): 549-559.
<https://doi.org/10.1080/14606925.2017.1347416>
- Wragg N and Barnes C (2016). Graphic designers' sense and knowledge of the user: Is thinking differently the groundwork for acting differently? *Visible Language*, 50(3): 29-62.
<https://doi.org/10.5040/9781474221627.ch-002>
- Wu S (2020). Development of graphic design based on artificial intelligence. *Journal of Physics: Conference Series*, 1533: 032022.
<https://doi.org/10.1088/1742-6596/1533/3/032022>