



HEMA in the map of science

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Abstract – This article aims to place HEMA on the map of science. To be able to start this work I have to find an appropriate definition on science and on discipline (field of science). After describing main characters of a discipline I investigate HEMA if it shows this characteristic or can be recognised as an interdisciplinary field. The second question I focus on is the place of this field between disciplines and interdisciplinary topics. For this investigation I review methods of bibliometrics and scientometrics and choose a fitting method to be able to get an answer. I also choose a relevant sample of publications the chosen method can be performed on. After mapping HEMA and having result of the chosen method I try to give a picture on the development of in-field usage of HEMA-related works (how often relevant articles are cited by other HEMA-related articles).

I. INTRODUCTION

This article aims to give an approximate determination on HEMA's place between fields of science, where science is mainly considered as a synthetic expression for natural sciences (often referred to simply as “science”) and social sciences (often referred to simply as “scholarship”). Therefore the expression “map of science” incorporates both big parts and it is referred to as natural and social sciences as well. Science as expression in this paper is used with its wider meaning including both areas. Considering that this paper mainly focuses on fields of social sciences. Papers dealing with social topics often have a local character which makes these disciplines heterogeneous in contrast with natural sciences.

AIM OF THE ARTICLE

For there were earlier no defined place for academic publications related to this topic this research will be performed on several selected articles, where references and bibliography will be inspected and categorized by fields of science. I hope to be able to determinate weight points of different related fields among inspected references. The sample of articles is not representative - there is no specification how a representative sample could be selected - therefore my results can only give a rough guess on weights of related fields. I also aim to find an appropriate definition on science and on “field of science” to be able to decide if HEMA could be identified as a separate field of science. For I assume to find HEMA somewhere between History and Sport sciences, I investigate definitions of interdisciplinary fields.

Inspecting resources dealing with this topic I venture upon to map the relationship of these interdisciplinary fields to be able to locate HEMA on a map of science. This result can be useful for researchers to be able to find relevant literal resources easier, define relevant

models for researching HEMA and identify institutes and non-HEMA researchers who can provide methodological and scientific help for HEMA-researchers' work.

II. HYPOTHESIS

1. HEMA can be identified as an interdisciplinary field of science.
2. Main sources of HEMA publications are belonging to different fields of history. As another main kind of sources we can identify other publications on HEMA topics.
3. The number of HEMA-related sources per publication has grown in the last 20 years. (I assume that HEMA-related practical and theoretical research activities have been reinforced by the spread of internet.)

III. METHODOLOGY AND APPROACH

Martial arts are often recognised as a group of sport activities. Some of them have an ancient, less a new origin. Sport is considered as an independent field of science, where martial arts have a dedicated place. Historical character assumes the strong relevance of history as a field of science, where more parts of this field can be considered as relevant. Other fields of science can be in scope while researching HEMA. Considering cold weapons described in original sources physics can have a strong relevance too. Injuries and other effects caused by using weapons and techniques described in manuscripts explain the relevance of medical sciences (anatomy in the first line).- More fields of science can be considered as tangential relevant, considering for example biomechanics, economical pertinence of wars and campaigns or cultural, anthropological questions regarding to conquering the new world and spreading HEMA over the sea.

To be able to determinate if HEMA was an interdisciplinary but separate field of science I have to have find an appropriate definition on science and on "field of science". For this purpose I collect definitions from different significant institutes whose scientific activity counts to world's leader category. Based upon these definitions a characteristic of a separate field should be determined which helps to determinate whether HEMA could be a separate field.

As a basis of positioning HEMA between different fields of science I investigate bibliography, resources and citations of different articles and publications on HEMA. Weight and significance of related fields will be determined by selected methods. For mapping different fields and branches of science and a list of methods are described and used by scientometrics, which is also a considered as a field of science.

Selected articles will be put in historical order which makes possible to investigate the relationship of HEMA-related sources listed in their bibliography

IV. WHAT IS SCIENCE

- Webster: a department of systematized knowledge as an object of study (<http://www.merriam-webster.com/dictionary/science>)

- Oxford: the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment
(<http://oxforddictionaries.com/definition/english/science>)
- The Science Council: "Science is the pursuit of knowledge and understanding of the natural and social world following a systematic methodology based on evidence." (<http://www.guardian.co.uk/science/blog/2009/mar/03/science-definition-council-francis-bacon>)

Based on the definitions above we can say that different approaches on science's meaning have two main points in common. One of these is the systematic character and as a second that it is based on facts (evidence, observation, deductive approach and feedback). Systematic character is underpinned by methodology which also corresponds with the point of facts and evidence: in every field of science proven methodology is the way to inspect facts and execute examinations which finally lead to accepted evidences that can be a pillar of thesis. On the primer line we need facts proven by accepted methodology. There is also a second line where works refer to thesis of the primer ones.

V. WHAT IS A DISCIPLINE

As having a rough imagination of the meaning of "science" we should have a look on the definition of "field" or "discipline" of science, which is essential for defining what "interdisciplinary" means. Scientometrics describes methods for science mapping in different approaches, e.g. geographical spreading of a discipline, but also ones for describing relationship between disciplines based upon publication's references (Abercrombie et.al. 2012). As data source of references SCI¹ is the most common one to use. ISI² subject categories often also give the structure of scientometric maps (e.g.: <http://www.leydesdorff.net/map06/>). Considering that ISI is mostly dealing with natural sciences and does not go in details of most social sciences (see: <http://www3.isi.edu>) social sciences (e.g.: disciplines of history) are hardly displayed on most maps of science.

As a general approach several authors specify characteristics which can be used to identify a discipline. Bridges emphasizes the significance of *research* and enquiry for *answering specific questions* (Bridges 2004:4). According to Burr (1954) *methods and own concepts* are also important specialities of a separate discipline. Taillon describes a four-stages development process how the examination of a new academic phenomena will be transferred to a discipline. His stages are based on:

1. new subject of matter
2. appropriate methods
3. specific knowledge underpinned by original research publications
4. new ways to present scientific information (Taillon 2009:11-12)

¹ Science Citation Index

² Institute of Scientific Information

Stichweh (2001:13728-13729) also emphasises the importance of scientific publications, but also puts a community of authors, the presence of a scientific production process (~methodology) and the search for novelties in focus.

Krishnan (2009) has merged views of several authors discussing the question of defining “discipline” started from the etymological origin of the word and including common use of its meaning. He identifies six factors in his work and states that the presence of these factors are likely to determinate a standalone discipline. These are:

1. A particular object of research ,
2. Accumulated specialist knowledge,
3. Theories and concepts,
4. Specific terminologies or a specific technical language,
5. Specific research methods,
6. Institutional manifestation (universities or colleges, respective academic departments and professional associations) Krishnan (2009:9)

After that Krishnan smoothes these strong statement by saying that not all disciplines show all of these six characters, but the more of these a field has the more likely it will be recognised as a separated discipline of science (Krishnan 2009:10).

Upon authors’ works mentioned above we find that most of them agree in following factors to contribute to delimit a discipline:

1. Subject of matter
2. Specific knowledge
3. Specific theories and methods
4. Specific terminology
5. Own publications

If we accept the approach suggested by Krishnan we can say that the strength of characteristic described above determines the strength of a standalone discipline. The strength of this characteristic can be imagined as a fuzzy membership factor of being a discipline where its complementary set is being interdisciplinary field of science.

VI. AN ATTEMPT TO DETERMINATE IF HEMA WAS A DISCIPLINE

Here I try to apply this model on HEMA based on my opinion which can be a matter of discussion. I emphasise that only my own view is included here and it needs a research involving a wide range of specialists dealing with HEMA topics to gain an objective picture or other methods of research could be applied which I did not research now because the time limitation I face during the preparation of my work.

1. Subject of matter: on one hand it can be exactly determined that cold weapon usage approximately in the middle age and the first half of the new age can be this matter, including written material, methods and correspondings. On the other hand there are a

plenty of research fields which do not aim to deal with HEMA exactly but produce results which can be used effectively in HEMA research projects, just like different fields of history, philology, biomechanics and linguistic.

2. *Specific knowledge*: I can identify fencing / weapon usage methods described in original manuscripts as a specific kind of knowledge, which is not assumed to be a core field of history science or sport science. Surely other sets of knowledge could be identified but “specific knowledge” is also not exactly defined.

3. *Specific theories and methods*: if I interpret this aspect as theories and methods of scientific research I’m not sure that a well paved (tested, documented and widely recognised) set of methods can be identified. It can be a field of further development.

4. *Specific terminology*: Terminology gained from original manuscripts surely can be recognised as specific terminology of HEMA. But if this point is interpreted as terminology of scientific research and methodology it can be only developed by developing scientific theories and methods of HEMA (see previous point).

5. *Own publications*: analysing relevant sources of HEMA topics I have realised that only few of them can be identified as scientific/scholarly papers (see analysis data below).

Summarising these five points I would say that they describe a kind of development process, where development starts by identifying subject of matter and previous points are priming next ones. As I have summarised my opinion how far HEMA is developed regarding these points in my opinion it shows that subject of matter and specific knowledge could be regarded as being specific to HEMA, while further points are on their way but far not developed enough to prime the identification of HEMA as a discipline. For this reason I identify HEMA as an interdisciplinary field which can be developed to a standalone discipline by intensive and persistent scientific/scholarly activity.

VII. METHODOLOGY OF MAPPING SCIENTIFIC DISCIPLINES

While bibliometric mapping is mainly based upon the analysis of publications' bibliography (e.g.: Abramo et. al. 2012, Della Mea 2011 and Palmer et.al. 2005), where distribution analysis (assessing counts and percentages) plays a determining role, scientometrics uses another (similar) vary of methods to determinate relationship between disciplines. Among these we can find methods of full text search which uses a list if relevant expressions which indicate relevant disciplines, relations between analysed publications based on co-words and co-citations, or prognostic modelling for deeper understanding the future ways of development of a specific discipline (Ivancheva 2001 and Ivancheva 2008). During my research on HEMA-related publications I did not find any authentic list of relevant keywords. Regarding actual time limits of preparation of this article I do not perform a systematic research on all possible sources of such keyword list but I presume that a comprehensive and authentic source of HEMA-related specific keywords is not available. Further theses based on this supposition can

be queried. Based upon the set of available data, tools and methods and regarding time frames I'm going to inspect a set of relevant publications by bibliometric methods.

VIII. CHOSEN METHOD OF BIBLIOMETRICS

Analysing articles referred to in previous paragraph I will analyse relevant publications using simple statistical methods assessing counts and percentage of referred sources. An ad-hoc chosen, but relevant sample of publications will be selected, where relevance is based on its topics (indicated in titles) and the place/organisation of publication.

A highly relevant topic of this investigation is discipline-based categorisation of cited sources highlighted in inspected publications' bibliographies. Counts, percentage, distribution and count-based weights are recognised as main indicators. Average number of cited sources, and number of disciplines listed in each publication also will be calculated.

Affected disciplines - weighted by the number of references - will be listed as a result, which is a basis for testing Hypothesis 2.

IX. RELEVANT SOURCES

The relevance of publications is determined by their topics and publisher organisation. During this research I have processed only written publications. Publishers are Journal of Western Martial Arts (<http://jwma.ejmas.com/>), Free Scholler papers at Ars Ensis (www.arsensis.hu), Acta Periodica Duellatorum and HEMAC (hemac.org). I have also made search by relevant keywords on SOLO (Search Oxford Libraries Online, <http://solo.bodleian.ox.ac.uk>) in different libraries but there were no relevant matching articles on keywords like "european martial arts", "sword fencing" and similar trials (the best matching paper was the book of Alfred Hutton, but no scholarly articles). This result has underpinned my assumption that there are not many relevant scholarly publications to be found. I also agree that it was not a comprehensive search of relevant publications but it can be regarded as a signal.

The sample I have chosen for analysis was selected from JWMA, Ars Ensis, Acta Periodica Duellatorum 2013 (under publication process when this article was written) HEMAC, Feder (Pl) and Ochs. I have selected all publications from these publishers that had a structured bibliography, a total of 42 publications. The chosen 42 papers have together 700 sources in their bibliographies. More articles were available on most of the chosen sites which did not include a bibliography, lot of them not even any kind of sources or citations. Overall I have found that a lot of interesting articles are published, but the approach and quality is not homogeneous: some articles which do not have any references also include valuable ideas. Others keep a classical structure and are based on referred sources. A small part (under 10%) show scientific character (hypothesis, methodology, research, conclusion, authentic sources). This fact has also enforced my opinion that the scholarly character of HEMA-related publications should be strengthened.

X. KEY FINDINGS OF THE RESEARCH

Though referring mainly to scientific or scholarly sources is still not an expectation, but articles which use such kind of resources show more scientific character than others, which do not use them. Scientific or scholarly character was supposed if publishing organisation was a scientific one (e.g.: a university, a scientific journal or a research institute). Altogether 23% of resources were of this kind.

The 24 papers of the sample refer to 24 different fields of science. I have sorted them based on the proportion of references in the total of 700. The top five most referred fields give nearly 80% of them. These fields are shown in Table 1.

#	Field	Count	%	Cumulated %
1	Original	206	29,43%	29,43%
2	History	201	28,71%	58,14%
3	HEMA	96	13,71%	71,86%
4	Military	26	3,71%	75,57%
5	Sport	25	3,57%	79,14%

*Table 1: The top 5 most referred fields of the research sample
(source: own research)*

As a speciality of HEMA-related publications I can identify the high percentage of referred original sources (meant: manuscripts, codices, original fight books). The significance of history is also without doubt. On the third place we can find HEMA which I would highlight because of the significance of internal references: researches and articles use the results of other researchers of the same field. It points to the fact that a community of professionals and/or researchers is present or being formed. Its significance is highlighted by Krishnan (2009:9). The high percentage of history and sport supports my original supposition, that HEMA is strongly related to these disciplines.

There are 8 more cited disciplines which have their percentage over 1% in my sample. These are:

- Philology
- Philosophy
- Psychology
- Medicine
- Cultural History
- Linguistics
- Anatomy
- Archaeology

I have also analysed the yearly number of HEMA-references in the sample. The chart below shows the yearly distribution of the HEMA-references per publication.

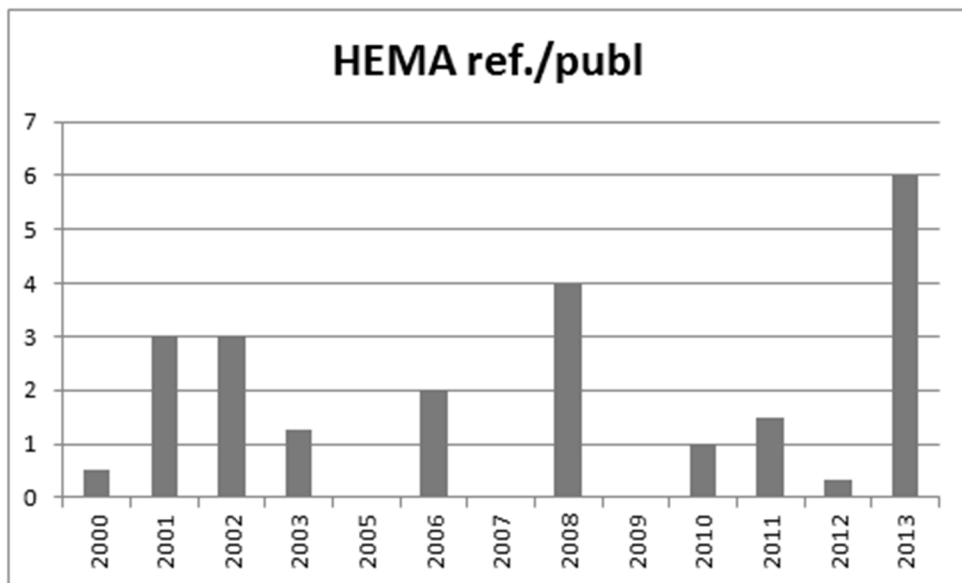


Figure 1.: Yearly distribution of HEMA-related references per publication in the sample (source: own research)

The pattern shown by the chart represents no definite trend. The low number of analysed publications can be a reason. I suggest repeating this query on a much bigger sample to get a reliable result.

XI. HYPOTHESIS TESTING

The first Hypothesis of this article was that HEMA can be identified as an interdisciplinary field of science. I have listed several sources focusing on the topic how a discipline can be identified, what are the key characteristics of a separate/standalone discipline. I have identified five key factors. Based upon the processed relevant works I assume that the presence of these factors can describe how far a field of science can be determined as a discipline. Analysing HEMA based upon these factors I have formulated an opinion that HEMA is still not a discipline but an interdisciplinary field, which can be developed to a discipline by research and scientific/scholarly activity.

As my second hypothesis I have supposed that main sources of HEMA publications belong to history. As another main kind of sources we can identify other publications on HEMA topics. By the analysis of 700 references I have found that history is the second most cited discipline, while HEMA is on the third place. Considering the tight frames of my research the hypothesis can be accepted.

My third hypothesis was that the number of HEMA-related sources per publication would have grown in the last 20 years. I have assumed that HEMA-related practical and theoretical research activities have been reinforced by the spread of internet. The first problem regarding my hypothesis was that the oldest relevant article I have found in researched sources was from 2000. Surely, in frames of a deeper research - covering more places of publications - earlier articles could be found. The analysis of publications from the last 13 years have shown an indefinite pattern which I consider to be caused by the small size of the sample.

Considering my three hypothesis I have reached marginal results. I have formed a subjective opinion on the first one, I have verified the second one and I was not able to bring a reasonable decision regarding the third one because of the low number of analysed publications.

XII. CONCLUSION

Historical European Martial Arts is a field of science and scholarly activity which is researched more and more intensively but still cannot be considered as a discipline - thus it shows several factors which can later contribute to the development of this field. I have made a small research including 42 publications from the last 13 years containing 700 references in their bibliographies. For its analysis I have made a rough summary on methods of scientometrics and bibliometrics and I have performed a bibliometric analysis on the selected sample. I have mapped HEMA as a field very near to the fields of History and Sport and also highlighted several other relevant disciplines which are also cited by researched articles. Finally, I did not manage to identify any pattern regarding the development of internal references. The size of the sample has created tight frames for my research. The repetition of this research on a significantly bigger sample might bring more reliable results. Among further possible subjects of research I would mention analysis of coincidences of references belonging to different disciplines. Further researches could involve another terms for disciplines such as multidisciplinary or cross-disciplinary, and their relation to HEMA. Hopefully my initial work has shown a possible direction of researching HEMA as field of science and its development.

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2	Talaga, M	A Kampfschwert from the 15th century – a reinterpretation of the so called 'Teutonic estoc' from the Princes Czartoryski Collection in Cracow, Poland.	Acta Periodica Duellatorum (under publishing)	2013
3	Waldmann, Sz	Mertein Hündsfelder: Fechtlehre mit dem Kurzen Schwert , circa 1491 AD	Acta Periodica Duellatorum (under publishing)	2013
4	Cvet, D.M.	A Brief Examination of Fiore dei Liberi's Treatises	JWMA	2008
5	Cvet, D.M.	The Measure of a Master Swordsman	JWMA	2005
6	Howe, R	Fiore dei Liberi : Origins and Motivations	JWMA	2008
7	Dupuis, O	A fifteenth-century fencing tournament in Strasbourg	Acta Periodica Duellatorum (under publishing)	2013
8	Bas, P	The true edge: a comparison between self-defence fighting from German "fencing-books" (Fechtbücher) and the reality of judicial sources (circa 1400 to 1550).	Acta Periodica Duellatorum (under publishing)	2013
9	Chandler, J	A brief examination of warfare by medieval urban militias in Central and Northern Europe	Acta Periodica Duellatorum (under publishing)	2013
10	Garry, J	Bayonet Fencing : World War I French Method	Acta Periodica Duellatorum (under publishing)	2013
11	Töröcsvári, A	Translation memory and computer assisted translation tool for medieval texts	Acta Periodica Duellatorum (under publishing)	2013
12	Rasmusson, M	Blossfechten and the Fechtschulen - German Judicial and Sport Dueling from the Dark Ages to the Renaissance	JWMA	2003
13	Hackney, C	Reflections on audatia as a Martial Virtue	JWMA	2006
14	Hand, S	The Practical Saviolo	JWMA	2003
15	Lovett, R	Principles of Fiore Dei Liberi's Martial System	JWMA	2002
16	Walczak, B	The Importance of Studying Historical Treatises	JWMA	2002
17	Docherty, F	A Brief History of the Quarterstaff	JWMA	2001
18	Zabinski, G	Several Remarks on the Blossfechten Section of Codex Wallerstein	JWMA	2001

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20	Mondschein, K	Towards a Historiography of Fencing	JWMA	2001
21	Kautz, P	Fiore dei Liberi's 7 Rules of Wrestling	JWMA	2001
22	Hand, S	A Matter of Time	JWMA	2000
23	Roberts, C	About Cornish Wrestling	JWMA	2000
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29	Fogl, L	HARC LÓHÁTON - FIORE DEI LIBERI, PAULUS KAL ÉS HANS TALHOFFER KÓDEXE ALAPJÁN	AE	2010
30	Majár, J	A LOVAGI ETIKA ADAPTÁLHATÓSÁGA	AE	2010
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