
UNIVERSITY OF WATERLOO

Faculty of Mathematics

Applying Search Engine Optimization for Camera Math Website

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2A Co-op Honor Mathematics

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Letter of Submittal

To: PD 11

From: Ying Liu

Date: November 11, 2021

Re: Work Report: Applying Search Engine Optimization for Camera Math Website

I have enclosed my first work term report, "Applying Search Engine Optimization for Camera Math Website", for my 2A work term in City of Chengdu, Sichuan, China. This report has not yet received any academic credit, and the successful accomplishment of which is the requirement of my Mathematics / Financial Analysis and Risk Management Co-op Program Degree.

Chengdu Zhuozhuo Technology co., LTD, in which I was employed as an intern operator, is supervised by Wenbin Li and operate an app named Camera Math developed by zhuozhuo team. This report is based my understanding of SEO to solve the problem of getting low rank in searching engine.

The Faculty of Mathematics requests your evaluation before the final marking process by qualified work report markers from the Math Undergrad Office. The combined marks would be the qualifier of my first work term.

Thank you for your assistance in preparing this report.

Sincerely,

Ying Liu

TABLE OF CONTENT

1.0 Introduction	.....	1
2.0 Analysis	.....	3
2.1 On-Page SEO	.....	3
2.2 Title Tag Optimization	.....	4
2.3 URL Optimization	.....	5
2.4 Off-Page SEO	.....	7
2.5 User Participation	.....	8
3.0 Conclusion	.....	10
4.0 Reference	.....	11

LIST OF GRAPHS

1.0 Figure 1, Search engine organic traffic.....	3
2.0 Figure 2, Comparison of Searching Result for a Random Question	5
3.0 Figure 3, URL on Website of Algebra.com.....	6
4.0 Figure 4, Linking domains from metrics over time	7
5.0 Figure 5, Windows for Commend and Feedback.....	8

1.0 Introduction

Nowadays, when individuals experience issues, one of the most convenience way is searching through internet. Thousands of people, inquiring question on internet and they will get answers from individuals in different professions around the word. There is a gigantic data base, how do people discover exactly what they want from uncountable posts? Search engines become an essential tool. For illustrations, as the most popular search engines Bing and Google, they collect information from diverse web pages, organize the resource into index, then rearrange the searching rank by hundreds of factors to help people get the best fit results.

For corporations or most content creators, getting the secrete of web traffic is an efficient way to attract potential customers. As the rank in search engines are reliable, individuals usually visit the websites that have high rank. In order to improve the rank in the search engine results, Search Engine Optimization or SEO provides them essential strategies to reach their goal.

One of the products of our company make is an app for solving all kinds of math problem. Staffs are presently building a question bank, which helps customers to find the solutions for their math question quicker by providing similar questions or even the same question they want to find out. The biggest problem this product has is that the rank of our resource is low on the engine. Thus, the optimization become necessary and would make our product more competitive.

To better understand how the SEO works, staffs will first need to familiar with the process search engines works. Firstly, search engines would gather the information

from websites, then all information would be added into the search engine's index. When searching takes place, it will automatically rank by factors such as keywords and provides results to users. By the SEO starter guide (Google Inc., 2010), the factors related to search ranking include the title, meta description, anchor text, and various other on-page content-based factors. Usually, staffs optimize by matching those factors from both On-page SEO and Off-page SEO.

To improve the rank of the content Camera math made, which is the biggest problem coworker meet, making progress by SEO is necessary. In this report, the goal is to basically state the principle of how SEO works, then the suggestions to improve our product, and how to reach this purpose.

2.0 Analyze

2.1 On-page SEO

On-page SEO is that finding more exact and effective keywords/search expressions through catchphrase inquire about, and utilizing these catchphrases or keywords in title tag, headlines, alt attributes of images and through-out content can encourage flag pertinence and noteworthiness of substance themes to the look motors in this manner offer assistance fortify search ranking (Zhang Sonya, 2017). Title tag, Meta description, and URL are three key elements for On-page SEO. How to make the HTML tags more related, or the anchor text more readable is the essential element of On-page SEO.

The front page is the direct window where search engines show feedback to users. There were billions of results that are related to one search. When user catch their target information, they usually open the first few tags. How can On-page SEO improve the rank of Camera Math's results?

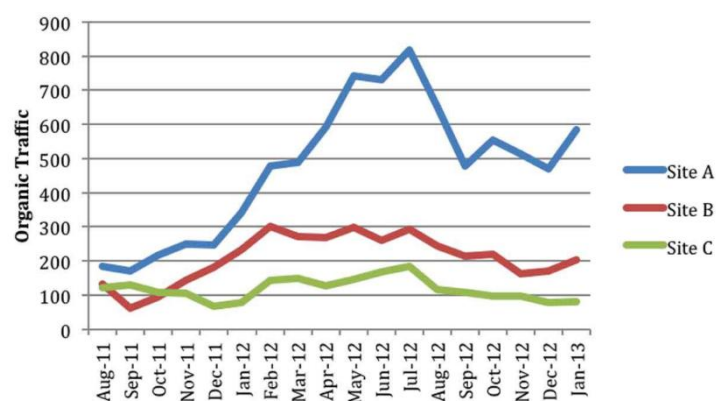


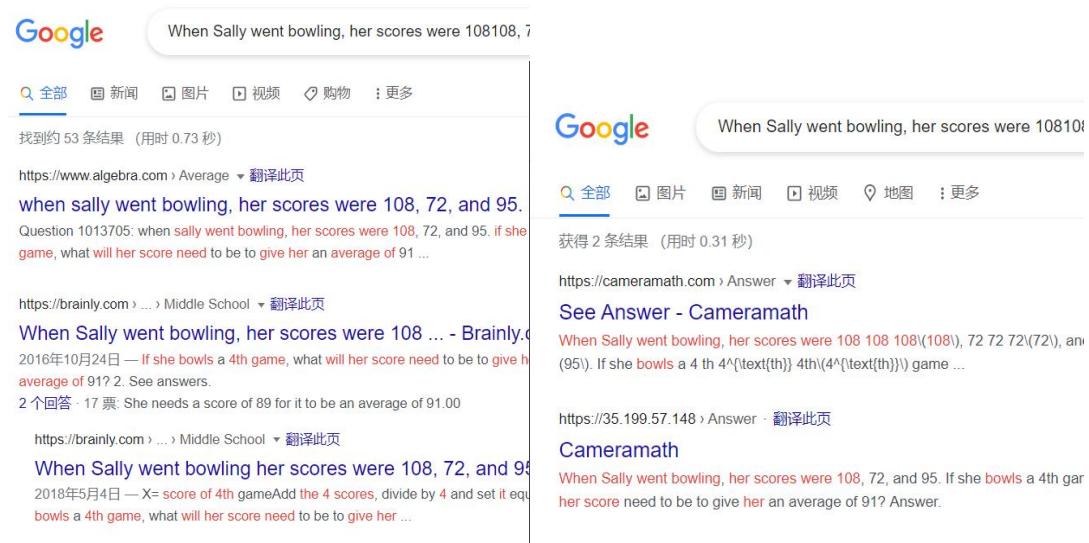
Figure 1, Search engine organic traffic: August 2011-January 2013 is from

The graph above compares the monthly search engine organic traffic of there websites over 18 months. All of them arrived at its most elevated organic traffic 8 months after SEO implementation, Google Digital Millennium Copyright Act (DMCA) updated on August 10, 2012. According to this result, On-page SEO could improve the organic traffic. This is the reason for this report to present On-page SEO to help solving the problem of getting low rank for Camera Math.

2.2 Title Tag Optimization

As when staffs recording the mathematics problems, staffs use exactly the original question. Thus, the meta description part is not out focus to optimize. However, staffs need to pay more attention on HTML title tag.

In searching the same question copied form the homepage of our product, there is no such tags from our app. After adding the exact searching “Cameramath”, it shows the searching result on the right hand below.



Note. Figure 2, Comparison of Searching Result for a Random Question is from

https://www.google.com.hk/search?q=when+sally+went+bowling,+her+scores+were+&hl=zh-CN&ei=_S62Yc6tBOS1qtsPvu-9gAc&ved=0ahUKEwiOoPSz4t70AhXkmmoFHB53D3AQ4dUDCA4&uact=5&oq=when+sally+went+bowling,+her+scores+were+&gs_lcp=Cgdn3Mtd2l6EAMyBAGAEBM6BQgAEIAEOgsILhCABBDHARCjAjoLCC4QgAQQxwEQQM6BAGAEEM6BQguEIAEOgcIABCABBAMOgcIABCABBAKOgsILhCABBDHARCvAToECAAQHjoGCAAQChAcSgQIQRgBSgQIRhgAUOQRWJSWAWDRlwFoA3AAeAGAAYkGiAHfapIBDTItMjUuMTUuMC4yLjGYAQCGAQGwAQDAAQE&scient=gws-wiz

It shows that our title tags are not related to the searching key words. Although, most meta description is corresponding, our tags get a low rank. To solve it, adding HTML Title Tag is necessary.

To edit HTML title tag, according to the way of using HTML by Rodriguez J mentions in his article, Camera math's staffs could learn and write something like:

```
<Head>

<title>When Sally went bowling, her scores were... -Cameramath</title>

</Head>
```

Or, building with a Content Management System (CMS) is an easier way to change the title tag for greater number of questions.

2.3 URL Optimization

URL which is the abbreviation of Uniform Resource Locator. It is the location or address for resource on the web. Also, as Rock Content Writer mentions, URL also indicates to the users about the information of the web page.

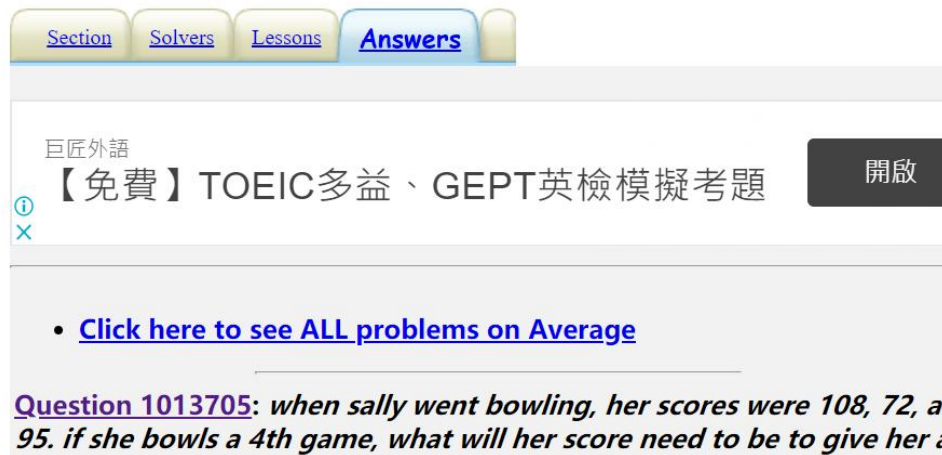
The importance of URL is well known in several ranking factors studies ([Searchmetrics, 2015](#); [SEOMoz, 2011, 2013](#)). The studies conclude a formula by using a genetic algorithm to define the query-document match score of document d

$$\text{Score}(d, q) = W_T \cdot S_T(d, q) + W_S \cdot S_S(d, q) + W_U \cdot S_U(d, q) + W_R \cdot S_R(d)$$

with respect to query q . As URL is represented by “ S_U ”, URL is one of the key elements in SEO.

To make a progress on the URL of Camera math’s content, here is a graph of a successful examples. This URL helps the content from “Algebra.com” get the first rank when searching a math problem about the average number for the scores of bowling Sally gets.

[Algebra](#) -> [Average](#) -> SOLUTION: when sally went bowling, her scores were 108, 72, and 95. if she bowls a 4th game, what will her score need to be to give her an average of 91? [Log On](#)



Note. Figure 3, URL on Website of Algebra.com is from

<https://www.algebra.com/algebra/homework/Average/Average.faq.question.1013705.html>

Typing the same question, the link of the first rank result (www.algebra.com) shows very details of URL, which almost contains the entire question. By imitate this URL, instead of using “<https://cameramath.com>> Answers”, and changing it to “<https://cameramath.com> > Answers > algebra > When sally went bowling, her scores... “would be more clearly for customers to understand this question is in the range of algebra, and from the Answers parts in cameramath.com. Not only this would help users to understand the path, it could also get a higher rank in searching result.

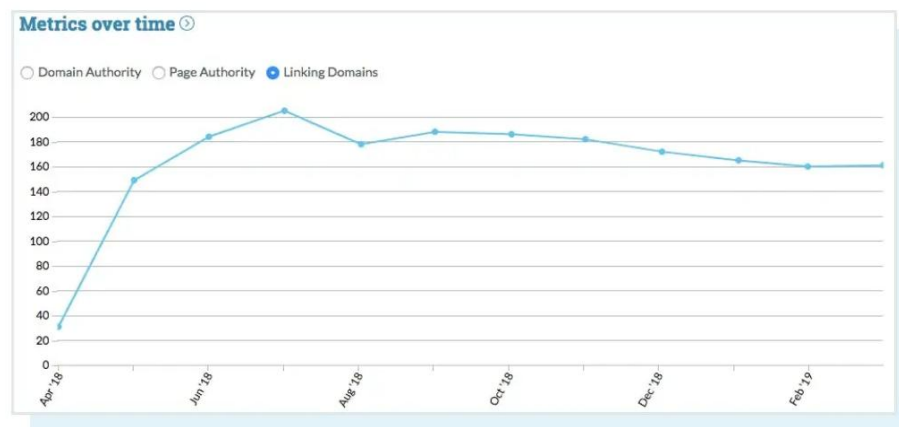
2.4 Off-page SEO

As on-page SEO is directly help users to get what they want to find, then off-page SEO is mainly for creator to make inside their website to make a better position on search engine. When searching for some keywords, there might be thousands of

results that all contains the key words in their title tags and meta descriptions. Only the on-page factors cannot provide a more general rank, thus there are off-pages factors.

Most factors about off-pages SEO are about reputation and population. The answers from a bigger website or having more comments are preferred when searching. Building links is also important. The measurements for connect building ought to coordinate the generally KPI of the location. These may well be deals, e-mail memberships, page sees, etc. You ought to moreover assess space specialist and/or page specialist scores, positioning of required watchwords, and substance activity.

The easiest way to measure your link building efforts is to track the increase in the total number of links to your website or page. Moz's Link Explorer is a great tool, as figure 4 shows.



Note. Figure 4, *linking domains from metrics over time* is from

<https://moz.com/images/learn/guides/BGSEOAsset-43.png?auto=compress%2Cformat&fit=crop&fp-x=0.5&fp-y=0.5&dm=1554097963&s=e8c364efc559f8ed0b34dc7b429b960c>

2.5 User Participation

There were several elements that are considered like guest posts, pageview, links. For example, as the graph below, users could add a comment for the answers. The more comments the better chance to receive a higher rank. Also, the black box on the left corner is a window for quick feedback from users. Users could express their like or dislike for this part. What is more, the “< Previous” and “Next >” buttons provide the links for the similar question. Those links are the secretes to maintaining users to stay at the web. Mostly, people would have similar doubt on the relative stuff about the keywords they are searching for.

The screenshot displays a web interface for a comment section. At the top, it shows '1 Comment' and the site name 'Times Leader'. There are buttons for 'Recommend', 'Tweet', and 'Share', along with a 'Sort by Newest' dropdown. A 'Join the discussion...' input field is present, followed by 'LOG IN WITH' and 'OR SIGN UP WITH DISQUS' options, each with social media icons. Below this is a 'Like this article?' section with a text box for an email address and a 'Subscribe' button. A comment by 'Marius Pudzianowski' is shown, dated '5 hours ago'. The comment text reads: 'Mr. Gaut has a fine record. Maybe the judge will look at it, look at what Gaut has done lately, and decides he is incorrigible. Because obviously, one stupid act after another leading to frequent arrests going back to at least the age of 21, the rehabilitative properties of prison have not imprinted on him some desire to stay out of jail. Figuratively speaking, Hang 'em.' Below the comment are 'Reply' and 'Share' buttons. At the bottom, there is a 'Subscribe' button and a link to 'Disqus' Privacy Policy'.

Note. Figure 5, *Windows for Commend and Feedback* by Karyotakis is from

The biggest problem of our product is that, there are only the question and answers bank that are submitted by tutors. There is no such choice for customers to commend. So, adding such windows is necessary. Staffs could collect the information from costumes or even add comments by ourselves in order to increase the users' activity. Another advantage from doing this, Staffs could also gather the feedback from users. As there are different types in mathematics, such as algebra, calculus, trigonometry and so on. By collecting these statistics, staffs would know which branch of mathematic are most needed by users. Then stuff could pay more attention on these branches.

3.0 Conclusion

The biggest problem of the website of Camera Math is that the developers haven't consider how to improve the searching rank for the content. Although this is a great app that could solve any kind of mathematics problem, there are not many channels for potential customers to discover. Searching Engine Optimization would help to solve this problem.

Both On-page and Off-page SEO should be considered. For On-page SEO, changing title tag and URL to contain more information would increase the matching rate when users searching for what they want. On the other hand, user participation as a key element of off-page SEO is also important for increase ranking. By doing SEO, it would bring a huge profit for the websites.

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