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RESEARCH ARTICLE

ADDRESSING SOFTWARE TESTING CHALLENGES IN NAMIBIAN STARTUPS THROUGH A TAILORED TRAINING APPROACH

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Abstract

A crucial step in the software development process is software testing. It helps guarantee that the program is of good quality and satisfies the user's needs. But testing can be difficult, particularly for new businesses. The main software testing issues that 11 Namibian startups have encountered are listed in this document. The results show a number of issues, such as un familiarity with testing methods and techniques, inability to use different testing tools effectively, particularly suitable test automation tools, insufficient test coverage of software products, and uncertainty about when to begin testing the software. The difficulties result in low-quality products, endangering the ecosystem of Namibian software startups. There port suggest a software testing training method suited to the unique needs of startups as a first step in resolving the issues .A mixture will be used to create the training program.

Keywords: software startups, software testing, software testing training ACM Reference format: Erkki Sutinen and Hilma Aludhilu.2024.Bridging the Gap: Using a Customized Training Approach to Address Software Testing Issues in Namibian Startups

Introduction

Software startups are essential to the rapid and always changing field of software development because they foster innovation. Software startups are recently established businesses intended to develop new goods and services in highly uncertain environments [1].Software startups typically have a small development team headed by developers and are primarily product-driven [2]. They frequently work with little resources in an effort to provide products to customers rapidly, which lowers the quality of the final output. According to Aludhilu & Sutinen [3], the Namibian software startup eco system is seriously threatened by subpar software. The pursuit of stability and expansion is hampered by low product quality [4],and one issue that degrades . The software testing

difficulties faced by eleven Namibian companies are examined in this paper. The study suggests a software testing training method that is suited to the unique requirements of Namibian startups in order to overcome the difficulties. For software startup practitioners, quality assurance specialists, and academics who want to comprehend and enhance software testing in startups through training to guarantee the delivery of high-quality software, the findings are a useful resource. This paper's main body is structured as follows: Section 2 offers a review of the literature on software testing in startups. The study design is described in Section 3, along with the procedures for data collection and analysis. The research's findings are presented in Section 4, and they are discussed in Section 5. The paper is finally concluded in Section 6.

Testing Software in Startups For startups

Software testing is a crucial component of software development since it helps find and address flaws in the software, which increases product market acceptance [12]. Teams may shorten time-to-market and develop new features more quickly thanks to testing, which also facilitates faster product releases and promotes the product's sustainable evolution [8]. Startups must thus focus on software testing to guarantee that their goods are of the highest caliber and satisfy the demands of their clients.

Testing is incorporated into software development processes at different phases by startups. Some in corporate testing methods From the beginning, while others do shortly level. Eight software start-ups in southern Brazil were the subject of a study [12] that discovered no testing methods were applied when developing MVPs. Nonetheless, the technical teams used software testing methods like functional tests, pilot clients, specialist testers, and unit tests in the second phase. According to a research by klotins [5], some start-ups. prefer to test when problems become apparent and utilize user input to identify discrepancies rather than testing. Instead of conducting thorough internal testing, consumer feed back is used to identify inconsistencies in the product. There port indicates that startups may disregard software testing standards and that more investigation is required to comprehend the state of software testing procedures in the context of startups.

Testing Difficulties in Startups

Software startups face a number of obstacles when it comes to carrying out efficient software testing. Due to their tiny workforce and limited financial resources, startups find it difficult to devote enough time and staff to thorough testing. Due to their low resources and hurried deadlines, these firms don't invest a lot of money and time on testing.[13–14].Additionally, because software companies rely on basic web resources, they face difficulties in using testing methods and tools effectively [13]. In order to identify the issues causing a small South African IT company to produce software products with an excessive number of errors, Gruner and Vanzyl‘s study [15] examined the software testing procedure. The paper claims that startups have trouble guaranteeing software quality because of a hurried or disjointed development process, which usually ignores the testing step[15].Startups function within a fast-paced setting and strive for prompt product delivery to obtain a competitive advantage. Because of this necessity, testing is hurried or neglected. Furthermore, testing is focused on rapid user acceptance tests rather than more thorough small-scale tests, and there is typically no specialized test team or testers available. Testing education and training, testing planning, testing cases, conducting unit testing and test automation, having internal guidelines, policy and strategy, test timing, early versuslate testing, test documentation, test tracking, and recording are some of the solutions to the testing issues found in small IT companies that are covered in the study [15]. Establishing a specialized test team or hiring testers to carry out testing tasks and putting more formal testing procedures in place, such implementing specialized test roles in projects, is an additional option. According to the survey, small IT businesses can enhance their testing procedures by implementing test standards and test process improvement models. A comprehensive mapping analysis of seventy- four primary publications [16] discovered that software testing is essential to the success of companies. However, startups encounter difficulties such limited resources, time constraints,

and a lack of user and customer knowledge. Startups are unable to test products necessary for the production of high-quality software since testing is expensive and time- consuming [16]. Startups must strike the best possible balance between costs and time spent testing and how this develops. Additionally, a study by Unterkalm steineretal.[17]discovered that testing software is expensive and frequently compromised in startups because it is difficult for them to satisfy client demands on time while also producing a high-quality product. Software testing training.

In order to meet the ever-increasing demand for reasonably priced software testing, the industry must adapt [9]. In order to improve technical capabilities and close the gap between academia and industry, universities are therefore working hard to educate software testing and integrate practical into their curricula [18], placing a strong emphasis on testing education and practical [9–10,19–21] [22].To improve testing education, a numberof pedagogical strategies, course materials, and assessment instruments have also been put forth [9]. Even though institutions give developers who might work for startups a basis in testing, developers still find it difficult to conduct efficient software testing. Insufficient professional training upon entering the workforce is primarily to blame for this [9,11]. This demonstrates that aside from formal In addition to university-level software testing education, the dynamic industry requires more hands-on software testing training. According to a study by Hayashiguchi et al. [23], training programs are crucial for recent graduates joining the IT sector. They draw attention to the necessity for training programs that cover the skills needed for the changing technological landscape and digital transformation. This emphasizes the value of organized training programs to close the skills gap between industry demands and university education, guaranteeing that graduates have the skills they need to succeed in the quickly evolving IT landscape. Training is typically provided through industrial training, self-study with books or internet resources, or certification programs [9]. A study [11] on industrial training discovered that self-training, external training courses offered by companies, and internal training programs Studying is common. Conversely, higher diploma programs offered by vocational education institutes and shorter courses offered by universities were less common.

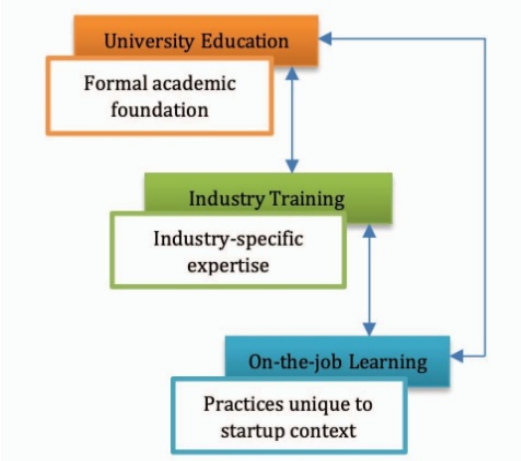

Figure1: Software education, training, and learning for developers in startups.

Even though there has been a lot of study and practice done on software testing education and training, there is still a need for improvement [9]. According to a study by Garousi [9], many startup developers acknowledged that they have not achieved efficient testing because they have not received the necessary education and training. Industry

training receives little attention in the literature, which mostly focuses on software testing education in academics [9–10, 19– 21].Therefore, this study focuses on software testing training in the business, with a particular emphasis on startups. In order to successfully meet the current software testing gaps and requirements, particularly within Namibian startups, we intend to build a testing training method for startups that includes a variety of testing activities.

Data Gathering

We conducted in-depth interviews with developer sat software firms and gathered data via an online survey. Both single- and multiple- response items were included in the questionnaire. Questions about software testing at startups and the testing

difficulties they face were included in the questionnaire. Table 1 displays a summary of the questionnaire's questions. The questionnaire was validated before it was distributed to the respondents. The questionnaire was examined by two experts to make sure it accurately represented the intended subject of the study and to spot any errors, including repeating or unclear questions [24]. The questionnaire was finalized after a preliminary pilot test and additional modifications. Two (2) intended respondents were given the most recent version of the questionnaire as part of the pilot testing process.

Questions
At what level of development is the testing done in the company?(Select all that apply)
What type of testing is carried out?(Select all that apply and specify others)
Does the company have a dedicated software tester?
If not, does it need a dedicated tester?
What software testing techniques are used in the company?(Select all that apply)
Is automated testing done in the company? If not, are you looking to improve and automate your testing

Startups face a number of testing issues, such as testers' lack of expertise with various testing tools, including automation tools, and developers' ignorance of testing methodologies. The difficulties are consistent with the body of research on software testing difficulties at startups [15–17].According to the findings, the problem is caused by either a lack of training, restricted access to resources, or a lack of skilled testers who are acquainted with the instruments This reveals a significant weakness in startup teams' understanding of software testing methods and resources. To improve their testing capabilities, startups must engage in training, skill development, or information exchange. Startups can better equip their testing teams with a deeper understanding of testing techniques, tools, and best practices by investing in training and skill development. This will enable developers to actively participate in the intestinal gas that they recommend for the study.

Conclusion

The findings of the study on the difficulties Namibian software companies face in software testing were reported in this paper. Startups face a number of difficulties, such as unfamiliarity with testing methodologies and techniques, inability to effectively use a variety of testing tools, particularly suitable test automation tools, a lack of comprehensive software product test coverage, and uncertainty about when to begin software testing. The report recommends investing in improved technology and automation tools, providing training programs, and incorporating team members in the testing processes ways to address issues. In order to improve developers' abilities and attitudes toward testing, we suggested a software testing training strategy that incorporates both cognitive and affective domains and focuses on comprehensive competence. By recognizing and creating tangible activities to address the testing difficulties faced by developers, future research will enhance the training methodology. By doing this, the information will be shaped, made relevant, and integrated with industry best practices.

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